

Mass organometallic drying

page 30

Useful xylene derivatives

page 37

Also more than 250 terse reports on chemicals, instruments,  
new processing techniques, equipment ..... 6

FEBRUARY 1960



# CHEMICAL PROCESSING®

with PROCESS DYNAMICS



Olin Mathieson's John Logan explains

## HOW TO WORK WITH A CHEMICAL DISTRIBUTOR

Page 27

When it comes to

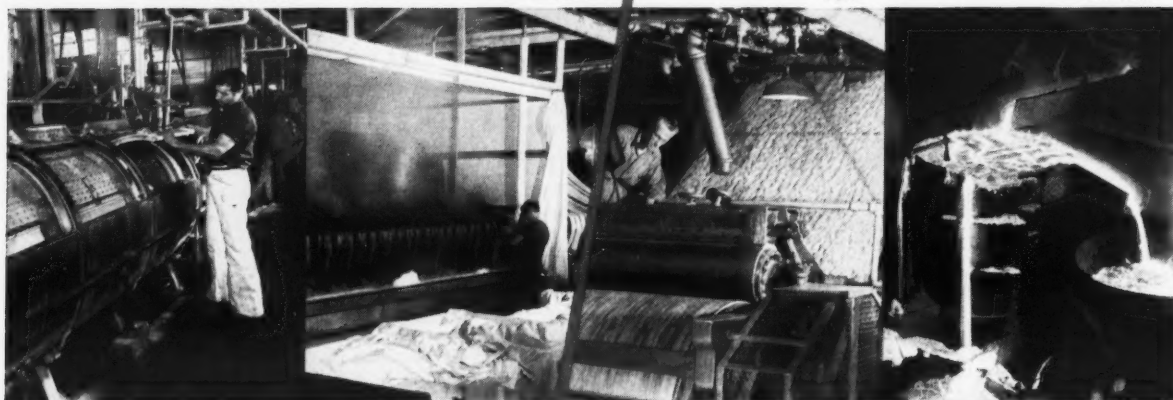
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TEXTILES

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Basic to America's Progress



**GENERAL CHEMICAL DIVISION**

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Check 3269 opposite last page.



## conventions and exhibits

February 1-4. American Society of Heating, Refrigerating and Air Conditioning Engineers, Semi-Annual Meeting, Dallas, Texas.

February 1-4. Instrument Society of America, Instrument and Automation Conference & Exhibit, Sam Houston Coliseum, Houston, Texas.

February 2-4. Fifteenth Society of the Plastics Industry, Reinforced Plastics Division Conference, Edgewater Beach Hotel, Chicago, Ill.

February 14-18. American Institute of Mining, Metallurgical, and Petroleum Engineers Annual Meeting, New York City, New York.

February 17-18. Chemical Market Research Association, Meeting, Lord Baltimore Hotel, Baltimore, Md.

February 21-24. American Institute of Chemical Engineers, National Meeting, Biltmore Hotel, Atlanta, Ga.

February 22-25. Technical Association of the Pulp and Paper Industry, Annual Meeting, Commodore Hotel, New York City, New York.

February 23-March 4. The Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, Exposition of Modern Laboratory Equipment, Penn-Sheraton Hotel, Pittsburgh, Pa.

March 10-11. The Fiber Society, Spring Meeting, Roosevelt Hotel, New Orleans.

March 14-18. National Association of Corrosion Engineers, National Meeting, Dallas, Texas.

April 3-6. American Oil Chemists' Society, Spring Meeting, Baker Hotel, Dallas, Texas.

April 3-8. 1960 Nuclear Congress, The Coliseum, New York City.

April 4-7. 29th National Packaging Exposition, American Management Association, Convention Hall, Atlantic City, New Jersey.



## THAT'S INTERESTING

### Non-woven towels

Towel supply problems of golf courses and bowling alleys are being met with inexpensive disposable towel made from non-woven fabric. Geon vinyl latex is used to bind cotton, rayon, and other natural and synthetic fibers to form fabric which resembles fine textiles in feel and appearance.

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Use of plastic film instead of towels in surgery is helping combat antibiotic-resistant pus-forming bacteria, a severe hazard for patients undergoing surgery. Film, a product of Union Carbide Plastics company, seals off operating wound from bacterial contamination from patient's own skin. Incisions are made through skintight vinyl sheet.

For more information on product at right, specify 3270 see information request blank opposite last page.



*clean stack at*

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**DRACCO GLASS-BAG FILTER HALTS AIR POLLUTION  
BY COLLECTING KILN DUST AT 600° F.**

The unretouched photograph shows the dramatic result produced by a Dracco Glass-Bag Filter at Dragon Cement Co., division of American-Marietta Co., Northampton, Pa.

The kiln is running at full capacity—but no visible dust is escaping from the stack connected to the Glass-Bag Filter. The filter is collecting the extremely fine dust with virtually 100% efficiency. Duplicate equipment has been ordered to eliminate visible dust from the other stack.

Convinced that this is the best answer to air pollution from kiln stacks, Dragon has ordered three more Glass-Bag Filters. Soon all stacks will be clean at Dragon!

**Exclusive dust removal techniques** assure extra-long bag life. At Dragon, Dracco's patented SONOCLEAN unit safely cleans the bags with sonics. Sound waves gently dislodge dust without wear or fracture of the cloth.

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**Dracco Glass-Bag Filters**, the first successful glass cloth collectors, are now collecting hot, corrosive dust and fumes in many industries—cement, chemical, metallurgical. Gases to 600° F. can be introduced into the filter where specially treated glass bags retain all visible dust.

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effluent. Sonic  
cleaning of glass  
bags is unique  
feature of high-  
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*For further information on Glass-Bag Filters,  
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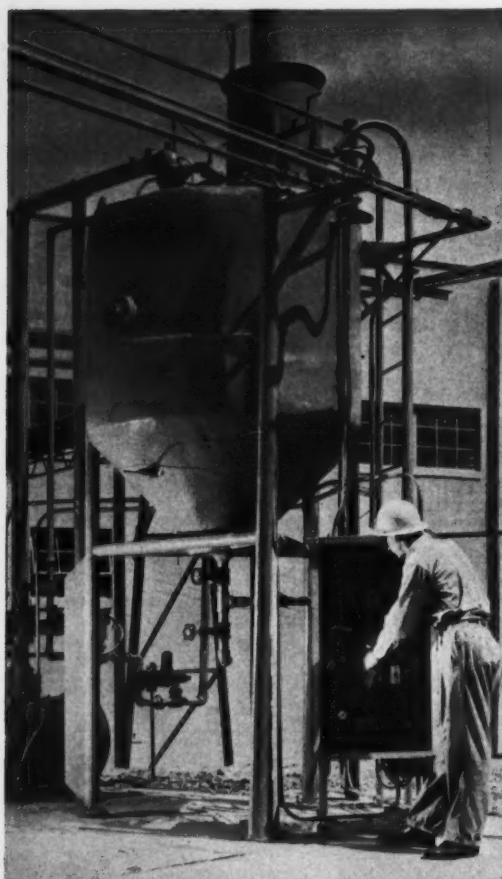
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dust control equipment



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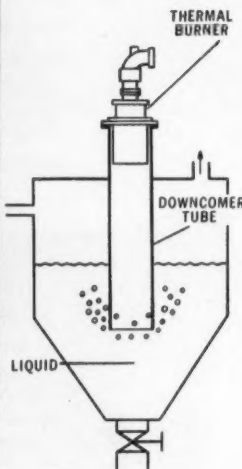
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- Combustion & Heat Transfer Equipment

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CHEMICAL PROCESSING PREVIEW  
and CHEMICAL BUSINESS

*For the management team*

*More than 50,000 copies of this issue*

Vol. 23

February 1960

No. 2

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CHEMICAL PROCESSING serves members of the Management Team in these industries:

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Soap & cleansing products  
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Fertilizers

Animal & vegetable oils & fats  
Miscellaneous chemicals (cosmetics & toiletries, inks, insecticides, water treatment chemicals, etc.)  
Paper & allied products  
Petroleum, coal, coke-oven products  
Rubber products  
Stone, clay & glass products  
Atomic energy establishments

### Other Industries Utilizing Chemicals or Chemical Processes

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Textile dyeing & finishing  
Leather tanning & finishing  
Metal & alloys  
Machinery & equipment

Allied products (tobacco, photographic film, instruments, fabricated plastic products, etc.)  
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Manufacturers of specialized chemical equipment

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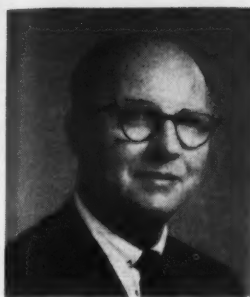
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CHEMICAL PROCESSING



over the editor's  
shoulder



### Computer control — Why?

In preparing the article "Are Unit Operations and Processes Obsolete?" (Jan. CP) counsel was sought of several companies working in the field. Probably as much time was spent discussing when the new approach is not, as well as when it is, needed.

Recently, we received from Monsanto a letter which ably summarizes the "when not needed" circumstances. It is from G. E. Russell, Manager, Systems Engineering Section, R & E Div., St. Louis. The letter follows:

"... Monsanto is, as you know, actively interested in computer process control, and has this under continuous study. Because the present cost of computer control systems is high, economic justification must be carefully considered. . . . Consequently the number of dollars required to justify a computer can be obtained only from a process where a small improvement will result in a large increase in financial return. Frequently a thorough study of a process will reveal improvements which can be made by ordinary engineering changes or by improvements in conventional instrumentation. For example, variations in composition may be averaged out by installing storage capacity in the system. Instead of a complicated control system to compensate for the variation, if such a simple action solves the problem, it will almost certainly be cheaper than the use of a computer. However, as process systems become larger, the number of variables increases and it becomes more difficult to maintain steady state conditions. When there are many significant variables, they may interact in complicated ways making the use of a computer necessary if operation at some optimum state is wanted."

*Editor East*

Editor East

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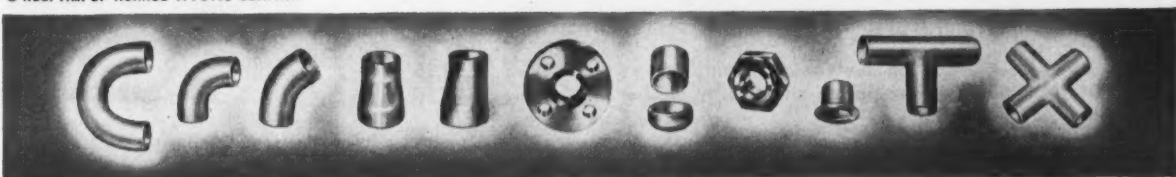


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# highlights

**CHEMICAL  
PROCESSING**

FEBRUARY 1960

VOLUME 23 • NUMBER 2

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## THIS MONTH'S COVER

The chemical distributor has come into his own as an integrated member of the CPI family. In the October CP, F. Dean Hildebrandt of McKesson & Robbins discussed this development from the distributor's viewpoint. This month we turn the rostrum over to John O. Logan of Olin Mathieson who takes a look at certain aspects of the producer-distributor relationship from the perspective of the former. His analysis begins on page 27.

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## SPECIAL READER SERVICES

• For more information on articles and advertisements in this issue, check the Reader Service slip opposite last page

• To subscribe to this magazine see reader-qualification form opposite last page



## Spotlight On People

C. P. PESEK, vice president for engineering and staff manufacturing, has been elected to board of directors of Minnesota Mining & Manufacturing Company.

Dow Chemical Co. has appointed MACAULEY WHITING to position of general manager of company's Midland Div., and elected him a member of Dow board of directors.

Appointment of DOUGLASS HENDERSON as vice president-operations and systems is announced by Thompson Chemicals Corp.

T. M. WELTON has been elected a director and vice president-marketing of Oronite Chemical Co.

Plastics industry division of Nuodex Products Co., Div., Heyden Newport Chemical Corp., has a new manager, JOSEPH P. PALUMBO.

ALLEN G. LILLA and CARL TEIWES have been elected vice presidents by board of directors of Naftone, Inc.

Vice president of Cardox Div., Chemetron Corp., is new title for C. EDWARD WOLFE, manager of Cardox's carbon dioxide activities.

Appointment of W. R. PRICE, Jr., as manager, commercial development services for Chemical Div., General Mills, is announced.

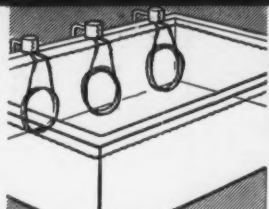
Hooker Chemical Corp. has realigned and expanded executive duties for three corporate vice presidents. THOMAS F. WILLERS will be responsible for Eastern Chemical, Phosphorus and Durez Plastics Divisions, as well as corporate engineering.

F. LEONARD BRYANT is assigned responsibility for corporate research, marketing and general development. JOHN S. COEY succeeds Mr. Willers as general manager of Eastern Chemical Div. JAMES W. FERUSON is appointed sales manager, Durez Plastics Div.

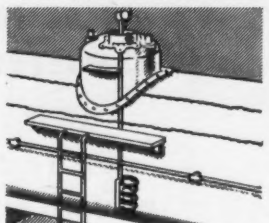
WESLEY E. GATEWOOD takes over as director of field sales for Barrett Div., Allied Chemical Corp.

Energy Div., Olin Mathieson Chemical Corp., has named

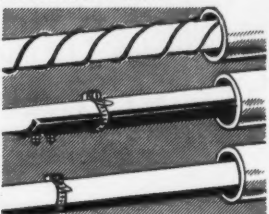
## Call your CHROMALOX Man for heating answers



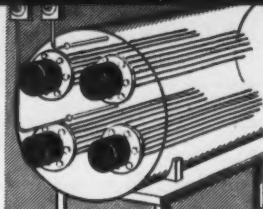
For plating applications, Chromalox CT Immersion Heaters are sheathed in lead, copper, stainless steel.



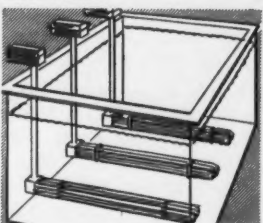
Heating viscous materials with BLCK Immersion Heaters before pumping from a railroad tank car.



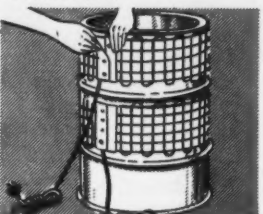
Pipe heating with Chromalox Therm-wire (300°F), Strip Heater (750°F) and Tubular Heater (1100°F).



Water heating with TM flange-type Immersion Heaters mounted at one end of a tank.



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- ☐ Send me Catalog 60 (General Industrial heating applications).
- ☐ Have a Chromalox Representative contact me.

- ☐ Send me specific information on the heating problems I have outlined on the sheet attached.
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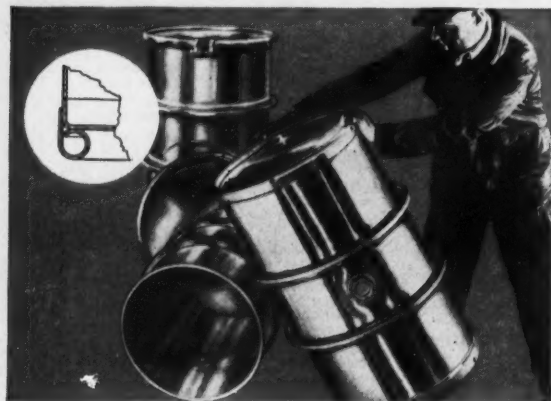
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Detail showing Hackney seamless chime construction.

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Hackney returnable stainless steel drums provide safe, economical handling of food and chemical products. Stainless steel resists corrosion, protects contents against discoloration and contamination. Rugged strength takes handling and shipping abuses. Smooth interiors, with seamless chime construction, are always easy to clean.

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## PEOPLE

DR. JOHN W. CHURCHILL director of research. His responsibilities will include those formerly held by DR. EARL W. WEILMUNSTER, who has resigned.

National Starch and Chemical Co. (Canada) Ltd. has appointed NORMAN RILEY vice president. He will be succeeded as manager of Montreal Div. by GERALD W. BURGONNE, formerly sales manager.

Board of directors of Monsanto Chemical Co. has a new member, ALAN H. TEMPLE, presently vice chairman of the board and a director of The First National City Bank of New York.

CARL MCFARLIN, JR., vice president and a director of Tennessee Products & Chemical Corp., is made responsible for chemical sales. Named to post of sales manager of Chemical Div., was RICHARD C. PATRICK.

Appointment of VICTOR P. BUELL, as vice president-marketing, is announced by Archer-Daniels-Midland Co.

Hooker Chemical Corporation's Durez Plastics Div. has appointed HENRY B. PUFF, manager field sales.

Union Carbide Corp. has named RAY H. CRIST as director of research for Union Carbide Research Institute and ERIC R. JETTE as staff consultant to research administration for the corporation. JAMES V. MURRAY, JR., has been appointed director of research for Union Carbide Olefins Co.

United Carbon Co., Inc. has elected MORRISON M. BUMP executive vice president. He will continue to serve as director of marketing.

An executive vice president has been named by Kaiser Aluminum & Chemical Corp. He is THOMAS J. READY, JR.

Another executive vice president is WILLIAM S. THORNHILL, of U.S. Polymeric Chemicals, Inc. HOWARD T. CUSIC, formerly sales manager of eastern div., has been elected a vice president.

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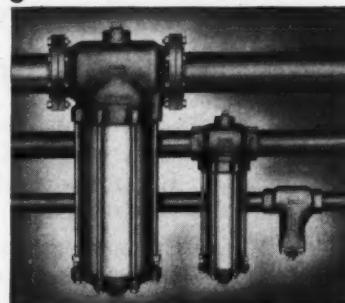
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CHEMICAL PROCESSING



at International Minerals & Chemical Corp., is being filled by R. J. DELARGEY.

BENNETT D. BUCKLES is appointed general manager of Semet-Solvay Petrochemical Div., Allied Chemical Corp. GEORGE KAZAN, JR., moves to post of director of commercial development and DAMON A. PETERSON to director of operations for the Div.

President of Nalco Chemical Co. is now THOMAS C. JONES. He replaces JOSEPH A. HOLMES, who became vice-chairman of board of directors, a position formerly vacant.

Texaco Inc. announces election of I. G. MORGAN as vice president-domestic sales.

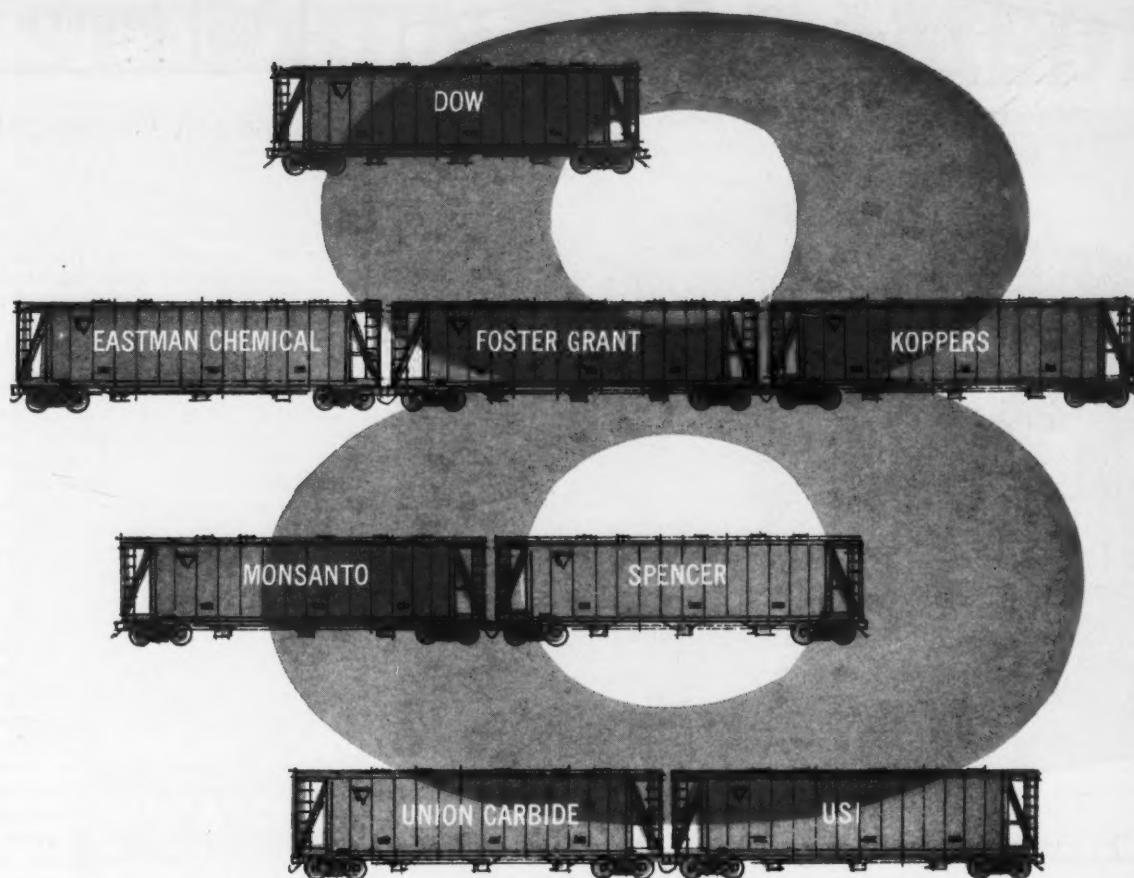
Five vice presidents for reorganized Corn Products Sales Div., Corn Products Co., are ROBERT W. BOND, market planning; DARREL K. BRICKLEY, sales services; JENKIN J. JONES, refined and processed oils; JOHN M. KRNO, sales promotion and development; and HENRY M. MAYS, feed and by-product sales.

MARTIN F. WILKERSON has been promoted to sales manager of Diamond Alkali Company's Chlorinated Products Div.

DR. ROBERT E. BROUILLARD is sales manager for newly formed Pigment Dept., Dye-stuff and Chemical Div., General Aniline & Film Corp. Appointment of ALLISON K. MAY to manager-surfactants and related chemicals, and ELDIN S. UNDERWOOD to manager-heavy chemicals of Antara Chemicals, sales division of General, has been announced.

A new director of Spencer Kellogg and Sons, Inc. is ROBERT L. TERRILL. He is filling vacancy created by retirement of DR. ALEXANDER SCHWARCMAN.

New office of vice-president of marketing at Pennsalt Chemicals Corp. is held by ALBERT H. CLEM. Replacing Mr. Clem as general manager of Chemical Specialties Div. is GEORGE R. LAWSON.



8 major chemical companies  
are now using the  
**DRY-FLO® CAR** for  
bulk shipment of **POLYETHYLENE**  
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Ask the nearest General American office about the advantages of bulk shipment for your product.



Airslide® and Dry-Flo® Car Division

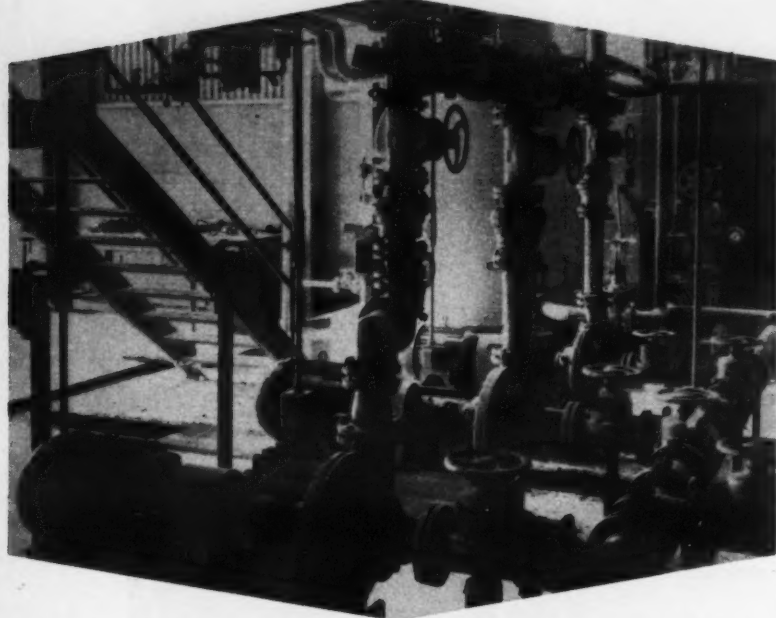
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Check 3278 opposite last page.

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for complete chemical coverage**



## how Goodyear handles corrosive liquids with **OLIVITE** acid handling pumps

At the Goodyear synthetic rubber plant at Houston, Texas, the two Olivite pumps photographed above give excellent performance in a corrosive application. The larger 4" pump handles 350 gpm of mother liquid containing about 4% by weight brine and .25% sulphuric acid from the shaker screen located between the rubber crumb soap conversion and reslurry tanks. The smaller 2" pump handles 70 gpm of .5% dilute sulphuric acid. Mother liquid and acid are combined for charging to the rubber crumb coagulation tank. TDH for both pumps is 110'.

Casings and impellers of Olivite acid handling pumps are protected against corrosion by a covering of synthetic rubber. Behind them stand the specialized knowledge and experience of Dorr-Oliver—the only manufacturer offering three distinctly different pumps for complete coverage of all needs of the chemical processing industries. For complete information, write Dorr-Oliver Incorporated, Stamford, Conn.



Check 3279 opposite last page.



## letters from readers

### French Chemical Industry

If reader response is any indication, Editor John C. Vaaler's two-part "Euro-Report," which appeared in the October and November issues of CP, touched on a subject of great interest on both sides of the Atlantic. Of the letters below on this topic, we found the comments on the French Chemical Industry by L. de Flers to be of particular interest.

Dear Mr. Vaaler:

With great interest I have read this report and must thank you for having devoted such an important paragraph to our Company. I wish to give you a few details and comments regarding the French chemical industry.

The total French exports of chemicals rose from a monthly average of 1,747.87 million lb for \$17.1 million in 1958 to a never-before-reached level of 2,874.7 million lb for \$25.3 million, in September, 1959.

Quotas on imports of chemicals from the U.S. have been nearly completely removed during 1959; and at present no difference is made on imports from OEEC countries or from the U.S. In all the European Economic Community on the 1st of July 1960, import-duties will be reduced by 10% and even perhaps by 20%, on products originating from Common Market countries. This reduction will be extended to all countries who are members of the GATT, the only condition being that duties will not drop lower than the future external tariff.

As was pointed out in the articles, there is in Europe and especially in my country a great shortage of chemists and chemical engineers. The fact is that in France a great number of engineers are rapidly promoted managers and no longer do any technical work.

Recently Pechiney and another large French firm, Saint-Gobain, have decided to merge their chemical departments. This new company will include neither Pechiney interests in aluminum or Saint-Gobain's glass activities.

Germany's Bayer (50%) and France's Progil (25%) and Ugine (25%) have created a company, with approximately \$509,500 capital. It will manufacture polyesters and polyethers to make polyurethanes. The plant is to be built at Pont-de-Claix, Isere, near Progil's facilities.

MR. L. DE FLERS  
Societe D'Electro-Chimie  
Des Acieries Electriques  
D'Ugine  
Paris, France

Dear Mr. Vaaler:

I was associated for some years with the work of building the European Economic Community, and I feel that you have made a very acute and entirely accurate observation when you say that it will be wise for American manufacturers to "... get on the bandwagon" in order to take advantage of this growing economic reality. This observation may also, of course, be extended to cover industries other than chemical processing.

MR. WARREN G. FUGITT  
Public Relations Department  
Gray & Rogers  
Philadelphia, Pa.

While in Europe, Editor Vaaler was impressed by the Central Information Service conducted by Farben-Fabriken Bayer's Patent Division. The following letter from Dr. H. Mohring explains the availability of this information to U.S. chemical industries. CHEMICAL PROCESSING will be happy to forward any inquiries (not orders) to Dr. Mohring.

# STEPHENS-ADAMSON

Dear Mr. Vaaler:

Our Ingenieur-Wissenschaftliche Abteilung compiles "Verfahren-technische Berichte." This abstracts more than 600 periodicals in the field of chemical engineering. They are issued by Verlag Chemie AG, Weinheim/Berstrasse.

In the form of three to five pamphlets per month, their price per year is DM 363 (approximately \$87) plus postage. In the form of an index-card system (each abstract on one single index card) marked by decimal classification (UDC), the yearly price is DM 429 (approximately \$103) in addition to postage.

It is also possible to obtain a large index-card system. In this each card is supplied in as many copies as may be required to permit a filing of the report in several sections of a card system, with reference to all authors, the numbers of the decimal classification, and index words for subjects not yet covered by decimal classification. For this system an average of 500 cards are supplied per week. The price is DM 2000 (approximately \$480) per year.

Any questions or orders concerning these abstracts should be directed to Ingenieur-Wissenschaftliche Abteilung, Farben-Fabriken Bayer AG, Leverkusen.

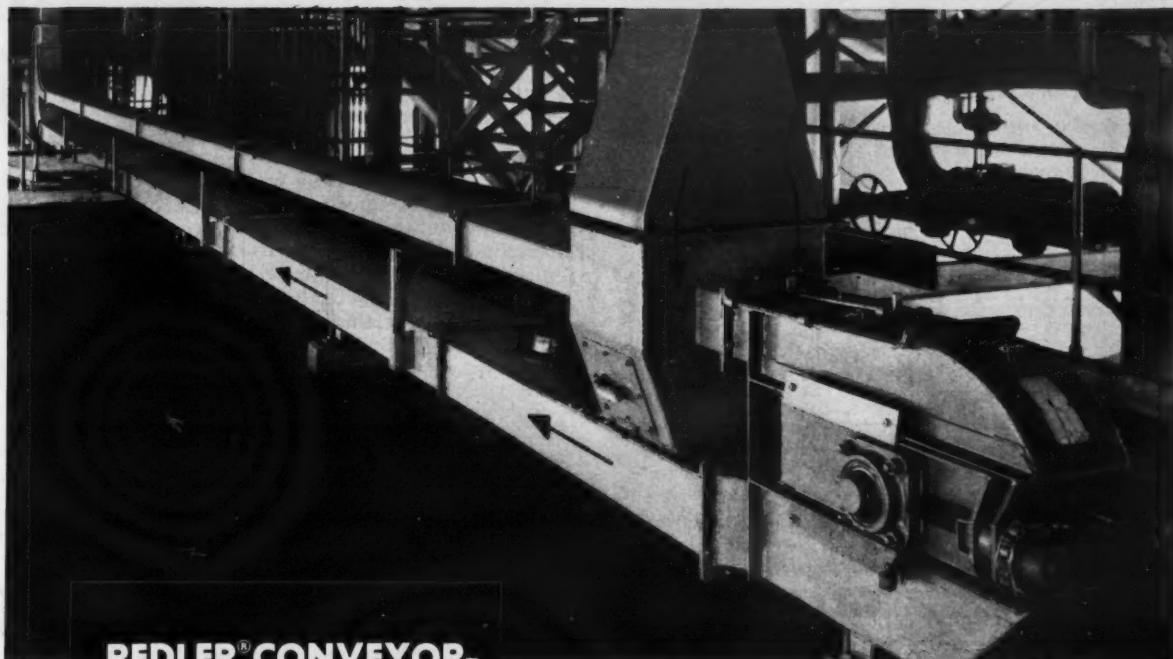
DR. H. MOHRING  
Farben-Fabriken Bayer AG  
Leverkusen  
Republic of West Germany

Dear Mr. Vaaler:

There have been many articles on this particular subject (European Common Market), from many different angles. I think that you've been able to wring the water out, melt the fat, or what have you, in bringing home to us the significant information.

MR. WILLIAM R. RINELLI  
General Manager  
Chemical Products Division  
Ansul Chemical Company  
Marinette, Wis.

To next page



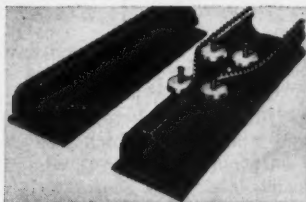
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S-A REDLER Conveyor-Elevators have been in successful operation for over 25 years, with well over 20,000 units now handling a wide range of pulverized, granular, small lump and flaked materials, in plants throughout the world. The REDLER Conveyor-Elevator moves material by an EN MASSE action horizontally, vertically, on inclines, or around bend corners. All movement is continuous and takes place within totally enclosed, dust-tight, compact casings, permitting large tonnages to be handled in small space. The conveying element is a series of U-type skeleton flights which move readily around sprockets, and bend corners with relatively low power required at the drive. Skeleton flights may easily be unhooked and replaced without tools. Handles up to hundreds of tons per hour and provides maximum versatility to handle hundreds of bulk chemical materials.

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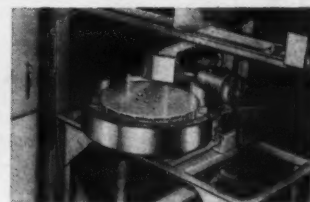
Cutaway Section REDLER Conveyor-Elevator shows skeleton flights loaded and unloaded.



"ZIPPER" CLOSED-BELT CONVEYOR-ELEVATOR—BULLETIN 349



BELT CONVEYORS—REQUEST CATALOG DATA



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358



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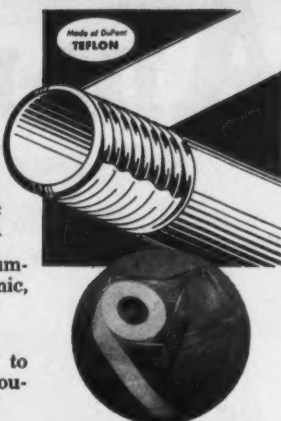


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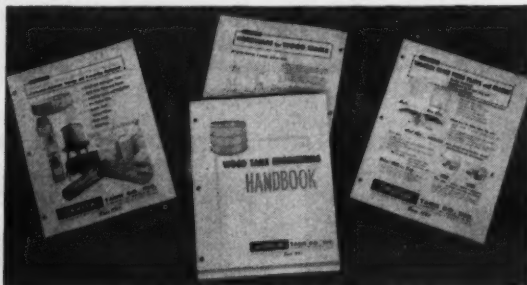
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Street Address .....  
City ..... State .....  
By ..... Title .....

Check 3282 opposite last page.

## LETTERS

### Daystrom misquoted

Sirs:

In your September issue you published an article on "Process Knowledge the Key to Computer-Control Future." In this were references to the reliability of computer equipment where our company was quoted as guaranteeing system availability of 90% over continuous periods of six months.

This was undoubtedly a typographical error. Daystrom, Control Systems Division, has guaranteed operational availability of better than 99% since August 1957. Supporting this is the official six months test at Louisiana Power & Light Company's Sterlington Station which will be completed December 31, 1959. Performance to-date indicates that the Daystrom computer system will meet its guarantee with a good margin.

Another reference made was to the effect that 99.9% would be the maximum achievable in reliability. Daystrom presently guarantees reliability of veracity at 99.9%.

CLIFFORD E. MATHEWSON  
Manager of Advertising & Public Relations  
Daystrom Systems  
Division of Daystrom, Inc.

### Chemical Booby traps

Sirs:

Congratulations for starting the "Chemical Boobytraps" series. Rather than being in a safety magazine which is read only by safety personnel, the series is in a magazine which is read by those directly concerned with the process and in a position to make necessary changes.

BRUCE J. HELD  
Industrial Hygiene Engineer

Safety and Fire Protection Branch  
Health and Safety Division  
Idaho Operations Office  
U.S. Atomic Energy Commission  
Idaho Falls, Idaho

## Babbitt Adjustable SPROCKET RIM with Chain Guide CHANGES THAT DANGER ZONE TO A SAFETY ZONE



The distance between the floor of your plant and your overhead valves is a DANGER ZONE when piled up boxes or even ladders are used to reach the valves.  
Turn it into a SAFETY ZONE — equip your overhead valves with Babbitt Adjustable Sprocket Rims with Chain Guides.

- They simplify pipe layout.
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- They are packed completely assembled (one to a carton), with easy-to-follow instructions.
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Babbitt Adjustable Sprocket Rims with Chain Guide are carried in stock by most mill supply houses. If your supplier does not carry them, contact us direct.

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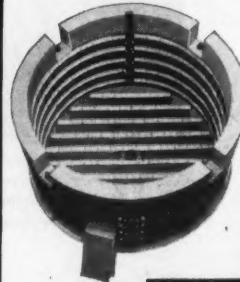
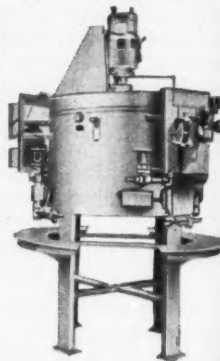
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## TRENT INC.

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CHEMICAL PROCESSING



## Watching Washington

### House Committee Reviews Depreciation-allowance Policies

A panel of tax experts has urged Congress to act immediately to liberalize this country's "outmoded" depreciation-allowance policy.\*

Their views—along with those of some 170 other experts on every aspect of income-tax law—make up the first phase of a broad study of the federal tax structure, now under way by the House Ways and Means Committee headed up by Wilbur Mills (D., Ark.).

At present, under the law, the CPI and other industries can claim deductions only for depreciation on original cost of new plants and equipment. Estimates have been made which hold that this historical-cost depreciation on all business assets is below its current dollar equivalent by something on the order of \$6 to \$8 billion per year.

"This deficiency of historical-cost accruals by reason of inflation is the main problem of tax depreciation today," the committee was told by George Terborgh, research director, Machinery and Allied Products Institute.

Mr. Terborgh feels that the most equitable liberalization of depreciation would be a frank adjustment for inflation, permitting taxpayers to restate original costs at their equivalent in current dollars.

#### Quick Action Urged

In his opinion, if an adjustment of this sort is not adopted, liberalization should take the form of a compensatory speed-up of the historical-cost allowances themselves. Whatever the form, the important thing is to get started as soon as possible, he told the committee.

Other panelists strongly supported this position. Depreciation allowances are di-

\* See "Depreciation and Tax Policy Unwise and Unsound," by Thomas C. Davis, Sept., 1959 CP, p. 30.

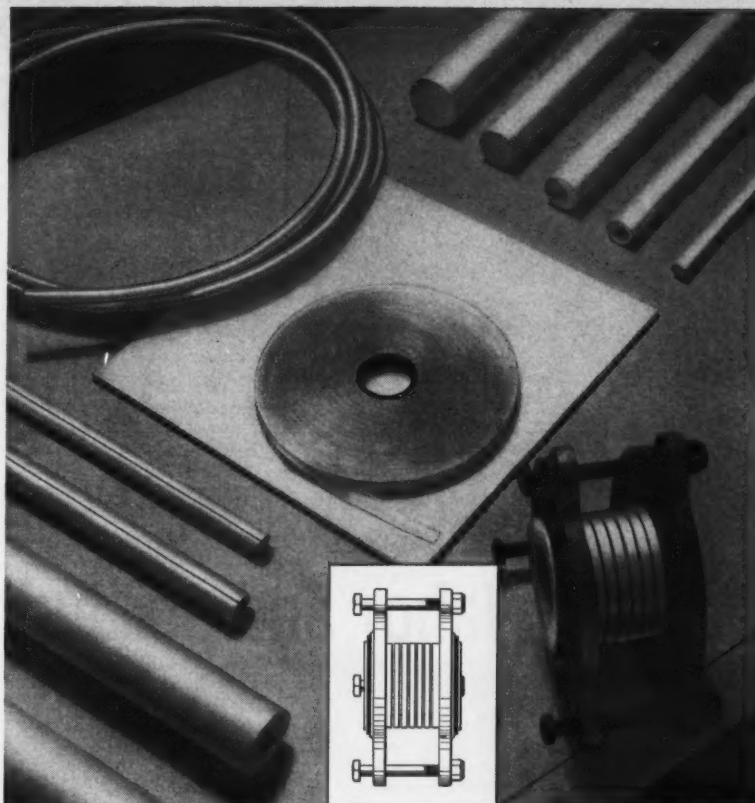
rectly connected with the modernization or the obsolescence, of the country's production base, Joel Barlow, Washington tax attorney, reminded the committee. "Our outmoded tax-depreciation structure has left us with a higher obsolescence factor in industrial plants than that of England or West Germany, our principal competitors in World markets," he said.

Since obsolescence for the most part must be combatted with retained income, there is an obvious relationship between rate of modernization and rate of depreciation allowances for income-tax purposes, Mr. Barlow pointed out.

Another panelist, George H. Kitendaugh of General

#### You Can Help

Congress is expressing a definite interest in our depreciation-allowance policies. Whatever your views on this subject, now is the time to express them to the men who matter in Washington and to the public. A letter to us along these lines will accomplish both these ends. A copy of each letter received will be sent to Rep. Mills, and representative excerpts will appear in these pages. Remember, public opinion was a vitally important influence in the Congressional thinking on the Labor Law passed last year.



For resistance to practically everything, specify R/M "Teflon" gasketing and other parts. The complete R/M "Teflon" line includes expansion joints (lower right corner of this illustration), color-coded thin-wall tubing, bondable "Teflon" sheets, etc.

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It will pay you to talk "Teflon" with R/M. Call your nearest R/M district office (listed below) or write Plastic Products Division, Raybestos-Manhattan, Inc., Manheim, Pa.

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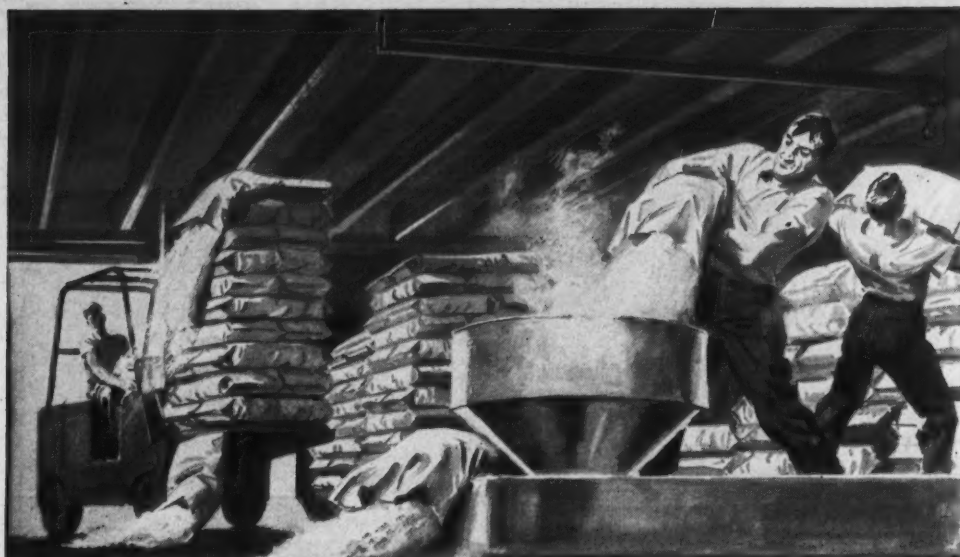
Manheim, Pa.

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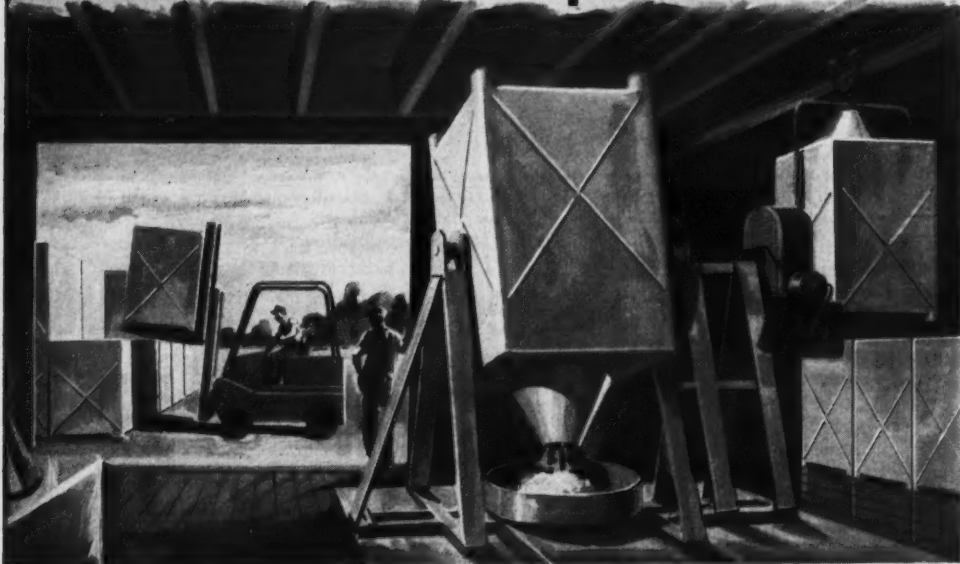


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Waste of labor, product, floor space, time is now outmoded—eliminate it in your plant today.

Powell's new Invert-a-bin\* Semi-Bulk Handling System has put an end to the biggest headache in handling granular products. These sturdy, easy-to-handle steel or aluminum containers are easy to fill and easy to empty. Weatherproof, they can be stored outdoors freeing indoor storage areas for production.

Ideal for inter-plant or intra-plant these units are considered part of special rail car with "freight free" advantages. Due to the simplicity of design, maintenance of the Invert-a-bin\* is nil.

Why continue losing time and money with old style disposable packages when this remarkable new Invert-a-bin\* is immediately available on either lease or purchase. Write for literature today!

### THE POWELL PRESSED STEEL COMPANY

HUBBARD, OHIO



Check 3286 opposite last page.

## WASHINGTON NEWS

Electric, emphasized the rapid rate of obsolescence, as new products, materials and processes result from an expanding national program of research and development. Faced with this "phenomenon of only recent vintage," businessmen have been forced to abandon historical experience as a guide to the useful life of their new facilities and substitute an informed judgment, Mr. Kitendaugh observed.

### Problem of Obsolescence

Looking ten years into the future, it is possible that half of the present products of the chemical industry may no longer have commercial value, Mr. Kitendaugh told the committee. The prediction he cited was made by Ralph E. Burgess, chief economist for American Cyanamid Company.

"To the businessman, these short-range trends, and many others . . . point to the high degree of obsolescence that must be anticipated with respect to production facilities now in place or being acquired," the panelist concluded.

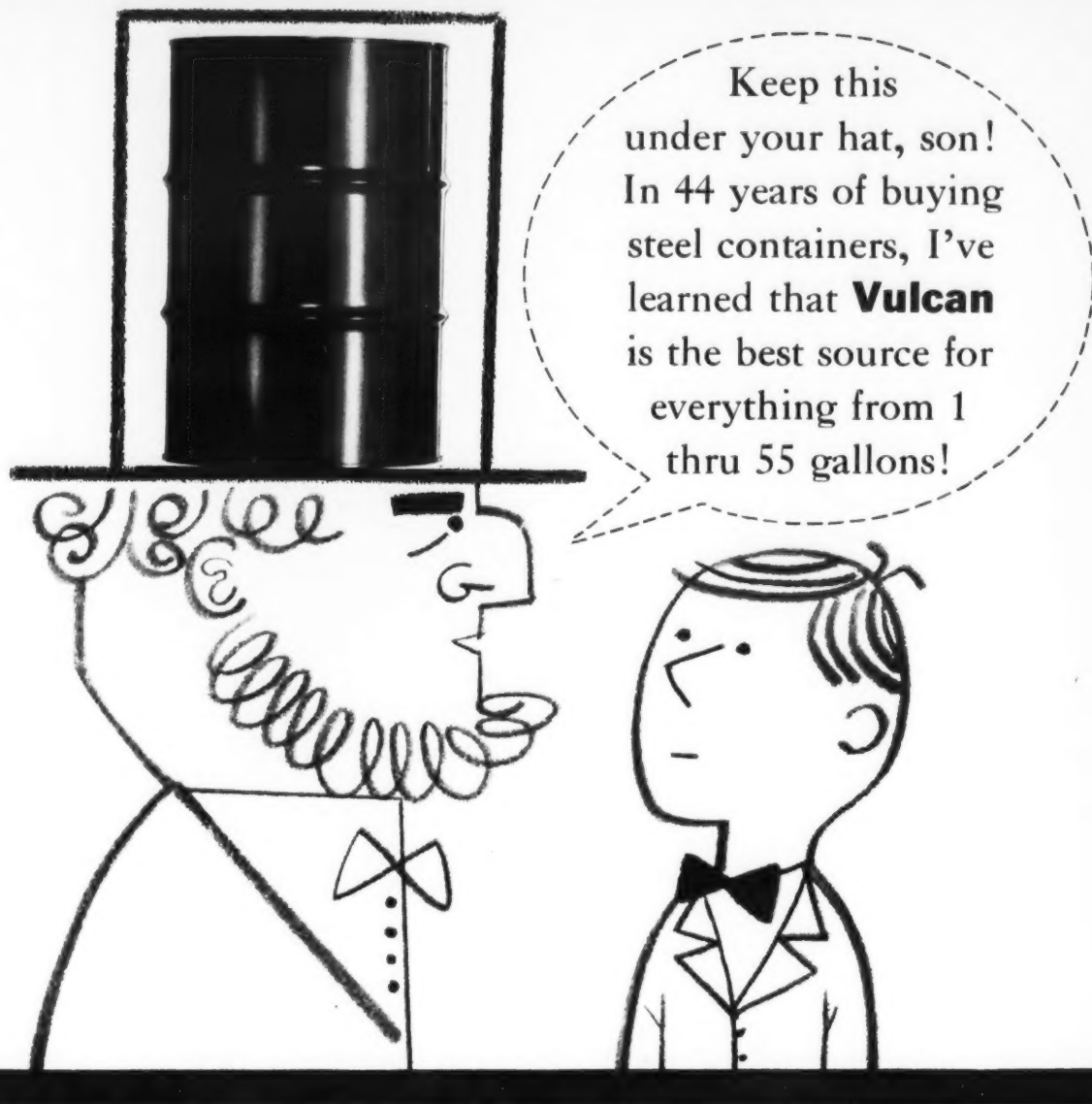
### Short-term Loss

Almost all panelists agreed that, while the government would face a short-term revenue loss from depreciation-allocation changes, such liberalization of existing tax policy would accelerate economic-growth-producing revenue in the long run.

With strong support for immediate reform on depreciation policy, chances are that election-minded legislators will introduce bills along these lines, although Committee chairman Mills feels that no revisions in the law will be made until 1961-62. But election years are full of surprises from Capitol Hill hopefuls.

For more information on product on pages 14 B-C, specify 3288 . . . see information request blank opposite last page.





That lesson needn't take you more than a few minutes to learn and here's why: **Vulcan** makes a complete selection of quality steel containers under one roof; everything from 1 thru 55 gallons, with all the closures, styles and linings you could want. In decorator colors, too! This means that you can order all of your container needs *most economically* with a combination truck, car or trainload shipment from **Vulcan**. ★ More important to know is that **Vulcan** quality, convenience and service costs no more than ordinary steel containers. That's the lesson for the day! Why not let your experience prove it soon!

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**Ammonium Nitrate**

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**Complex Fertilizer**

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(Prayon Process)

**Sulfuric Acid**

**Ammonium Phosphate**

**Oxygen**

**Fume Eliminator**

**Oil Absorber**

Existing plants designed and constructed by C & I are represented here by the flags throughout the world. Due to the Earth's curvature, some of the plants cannot be shown.

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Eight 1664 cfm Fuller rotary units compressing to 120 psig in tandem sets to four 700 hp electric motors. Compressor plant supplies 13,200 cfm load to oil refinery—for air tools, machinery, and other pneumatic uses.

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C-343  
1346

For details on the Fuller product line,  
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Check 3289 opposite last page.



George Shulman, Technical Director, Pfister Chemical Works has responsibilities on both technical and administrative levels. Hence, broad editorial coverage of CHEMICAL PROCESSING makes it an ideal publication for him

## Chemical Materials section in CP chief interest of technical director

**Also is interested in Chemical Business section for his administrative work and in articles about processes and plant equipment**

GEORGE Shulman, Technical Director, Pfister Chemical Works, Ridgefield, N.J., is responsible for all decisions of a technical nature in his company. He is in charge of research and development as well as production. Also, he spends a large portion of his time on administrative duties.

Mr. Shulman has been receiving and reading CHEMICAL PROCESSING for at least the last 15 years of his 21 years at Pfister. His comments on CP are as follows:

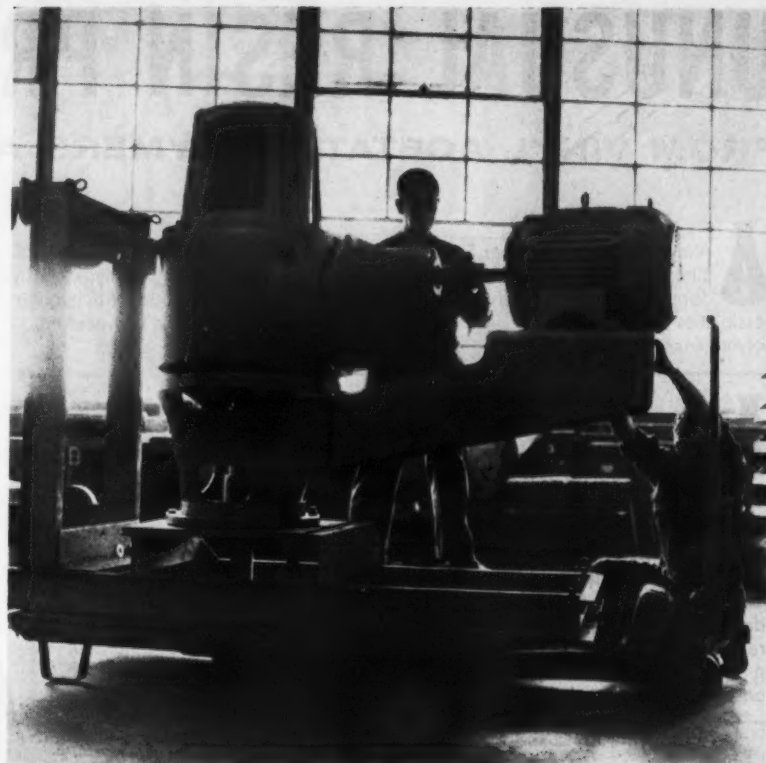
"My chief interest in CHEMICAL PROCESSING is the Chemical Materials section. I read the editorial articles and ads in this section to develop ideas for a new slant on our processes. I have sent

in for further information on many occasions.

"I also read articles in CP about processes and equipment since I am responsible for production. The Chemical Business section is likewise of interest to me since a considerable portion of my work is concerned with administration."

Broad nature of Mr. Shulman's duties makes CHEMICAL PROCESSING an ideal publication for him since it covers all phases of the field on both technical and management levels.

Broad scope of Mr. Shulman's job is accounted for by the fact that his company, Pfister Chemical Works, is not a large one. However, it



# NEW!

## Fast delivery on mixers this big

Why wait months when you need a turbine-type fluid mixer as hefty as this one?

You can get delivery of the new "5" Size LIGHTNIN Mixer shown here in a few weeks. That's because the speed reducer and other component parts are in stock at the factory, ready to assemble to your order.

Ratings range from 10 to 150 hp. And, at lower cost than ever for a mixer of this rating spread, you get these standard LIGHTNIN Mixer advantages:

1. Choice of 15 standard interchangeable speeds, 16.5 to 280 rpm.

2. Simple, on-the-tank conversion from double to triple reduction should process requirements change.

3. Gearing protected from shaft shock loads by unique hollow-quill construction.

4. Positive splash lubrication.

5. Complete weatherproofing protection.

For details, call your LIGHTNIN Mixer representative now. You'll find his name in Chemical Engineering Catalog, and under "Mixers" in the yellow pages of your telephone directory. Or write us direct.

## Lightnin® Mixers

MIXCO fluid mixing specialists

MIXING EQUIPMENT Co., Inc., 185-b, Mt. Read Blvd., Rochester 3, N.Y.  
In Canada: Greey Mixing Equipment, Ltd., 100 Miranda Avenue, Toronto 19, Ont.

Check 3290 opposite last page.

# UNUSUAL RESIN PROPERTIES

## FROM VINYL ACETATE POLYMERS AND COPOLYMERS



**Vinyl-Acrylic Copolymer Solution.** Resyn® 2404. New. Unique. Tacky, flexible film former. Designed for flexible film laminations and pressure sensitive adhesive formulations. Noncorrosive. Exhibits good heat and light stability. Application possibilities in laminations of "Mylar" polyester film, cellophane, cellulose acetate, polyethylene, saran, paper and foil.



**Vinyl Acetate Copolymer Latex.** Resyn 1103. Extremely clear, water resistant, hard films. High gloss. Small particle size. Good mechanical stability. Excellent for clay coating of paper, pigment binding, gloss coating, textile finishing.



**Vinyl Chloride-Vinyl Acetate Emulsion Copolymer.** Resyn 2507. First with relatively large particle size. High viscosity usually makes thickening unnecessary. Combining of acetate-chloride properties unique for adhesives. Easily formulated. Most plasticizers can be stirred in without pre-emulsification. Exhibits good wet tack. Mechanically stable. Good holdout on porous surfaces. Borax compatible. Uses: adhesives, fire retardant coatings, non-woven textiles, pulp molded products, beater additives.



**Vinyl Acetate Copolymer in Fine Transparent Bead Form.** Resyn 1310. New resin in the aerosol spray industry. Soluble in ethanol, various esters, ketones and aqueous alkali. Beads can be modified with specific organic aminohydroxy compounds to change the solubility, flexibility and tackiness of film. Correct formulation will produce aerosol sprays of varying water sensitivity and flexibility. Clear, flexible, water and solvent soluble films can be prepared from the properly neutralized alcohol solution. Available in semi-commercial quantities.



**Vinyl Acetate Emulsion.** Resyn 1601. Mechanically stable. Hard film exhibits good adhesion to glass and other polar materials. Easily compounded for adhesion to aluminum, wood, glass and many other hard-to-glue surfaces. Also may be used as a low temperature heat sealing base. Application possibilities in pigmented coatings and alkali-dispersible formulations for adhesives.



**Vinyl-Acrylic Copolymer Emulsion.** Resyn 2243. New. At same cost as other vinyl copolymers. Clear and permanently flexible films. Excellent water and heat discoloration resistance. Small particle size. Mechanically stable. Borax compatible. ZnO compatible. Properties ideally suited for a superior paint base. Outperforms both homopolymers and copolymers in scrubability and low temperature film formation. Color and sheen uniform over surfaces of varying porosity.



**Vinyl Acetate-Acrylic Copolymer Dispersion.** Glitter 2700. New. Extremely small particle size. Superior gloss and levelling obtainable in self polishing floor polish formulations. Excellent non-scuffing. Non-yellowing. Exceptionally resistant to water spotting. Yet easily removable with household ammonia, soap or detergent solutions. Also readily formulated into rebufferable industrial maintenance polishes.



**Spray Dried Vinyl Acetate Copolymer Emulsion.** Resyn 1401. White, powdery. Easily dispersed at 42% solids by mere addition of water and moderate agitation. Films deposited from water dispersions exhibit superior adhesion to metal, glass, wood and paper. Miscible with dry, reactive additives such as urea formaldehyde to form excellent water resistant films. Uses: adhesives, binders, coatings, where a dry product is required.

**National  
RESINS**

NATIONAL STARCH and CHEMICAL CORPORATION

750 Third Avenue, New York 17 • 3641 So. Washtenaw Avenue, Chicago 32 • 735 Battery Street, San Francisco 11

Check 3291 opposite last page.

## CHEMICAL BUSINESS

is the largest manufacturer of BON — Beta hydroxy naphthoic acid and derivatives.

Mr. Shulman has a BS degree in Chemistry from the City College of New York. He is a member of the American Chemical Society and the American Management Association. He has attended many seminars on management this past year conducted by the latter organization. His home is at Teaneck, N.J., three or four miles from the plant.

### Dummy missiles to give taxpayers big break

Dummy missiles containing highly sensitive, rugged instruments able to withstand terrific shocks will save U. S. taxpayers millions of dollars.

Leach Corp., Los Angeles, has developed a 176-lb instrument cylinder which is mounted in the nose of a Polaris dummy missile. It contains 15 lb of encapsulated instruments sheathed in a half-inch steel shell.

Test-launched from submarines or ship simulators to obtain research data, cylinder enclosed in dummy missile has withstood shocks of more than 1000 times gravity. It is estimated use of real missiles would cost millions of dollars more.



"Where do I plug it in?"



## Aluminum Organometallics Hitting Commercial Stride

**Texas Alkyls Inc.** has brought on stream a plant for commercial production of aluminumtrialkyls via the Ziegler process. Company, jointly owned by Hercules Powder Company and Stauffer Chemical Company, is currently producing triethylaluminum and triisobutylaluminum. Located on Houston Ship Channel, facility was originally scheduled to have a rated annual capacity of about a million pounds of aluminumtrialkyls. Process improvements incorporated in design have more than doubled that capacity rating.

Company plans to expand production early this year to include manufacture of ethyl aluminum sesquichloride, and diethyl aluminum chloride, other alkyl aluminum hydrides and chlorides, and  $C_6$ ,  $C_8$ , and  $C_{10}$  aluminumtrialkyls.

**Goodrich-Gulf Chemicals, Inc.** has decided to build a plant for production of oriented polyolefins in Port Neches, Texas. Construction of plant, which will have an initial capacity of 13,000,000 pounds annually, is scheduled for completion late in 1960.

**Heyden Newport Chemical Corporation** is starting a plant expansion at Fords, New Jersey, that will double current production of derivatives of ortho and para chlorotoluenes. Total expansion is to be completed in late 1960.

**Linde Company, Division of Union Carbide Corporation** announced that an on-site oxygen and nitrogen producing plant to serve Mobay Chemical Company at New Martinsville, West Virginia, is on stream producing 25 tons/day of medium-purity oxygen and high-purity dry nitrogen.

**National Starch and Chemical Corporation** plans a major expansion of corn milling operations at its Indianapolis, Indiana, plant to meet steadily increasing demand for chemically modified corn starches. When completed this year, new equipment will expand Na-

tional's wet milling capacity to seven million bushels per year.

**Furane Plastics Incorporated** has opened a plant in Hempstead, Long Island, New York. Approximately 6000 square feet are contained in new location.

**Mobay Chemical Company's** isocyanate facilities are in for a third major expansion scheduled for completion in July. This will raise Mobay's annual capacity to over 25 million pounds for tolylene diisocyanate. Third expansion follows close on heels of second, which was recently completed to raise capacity from 12- to 18-million pounds per year.

**Emery Industries** has broken ground on a six-million dollar oxidation plant for producing azelaic and pelargonic acids.

**Texas Eastman Company,** Division of Eastman Kodak Company has announced plans on a 20-million-pound production unit for polypropylene, to be built in Longview, Texas. Unit is expected to begin production in fourth quarter of this year and to reach full volume production in mid-1961.

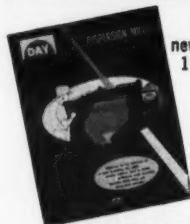
**Phillips Chemical Company** will increase production of "Cis-4" polybutadiene rubber to a rate of 20,000 tons/year by enlarging Borger, Texas, plant. Enlargement expected to be completed in August.

**Phillips-Joanna Company,** a firm jointly owned by Phillips Petroleum Company and Joanna Western Mills Company, has been formed to produce polyethylene film. Processing plant in Ladd, Illinois, is ca-

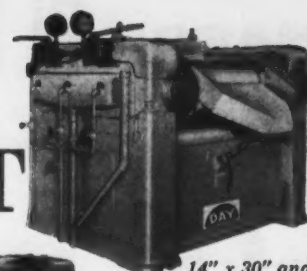
# EVERY FEATURE YOU WANT

## IN A 3 ROLL MILL... YOU'LL FIND IN A

**DAY**



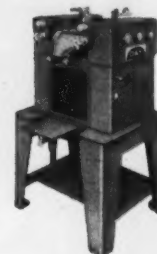
Write for  
new Bulletin  
158, or see  
your Day  
Field  
Engineer  
for full  
details.



14" x 30" and  
10" x 22"  
production models.



5" x 12" small  
production and  
pilot operation  
model.



4" x 8" laboratory mill.

Day 3-Roll Mills give you fast, consistent production at the exact fineness of grind you desire . . . are easiest to set-up, control, and to clean . . . give you years of trouble-free service at lowest maintenance costs. There's a Day Mill size to meet your batch requirements exactly — and all mills except the 5" x 12" are convertible for either fixed or float-a-roll operation.

Specify **DAY HYDRAULIC ROLL SET** — you'll obtain the most advanced roll setting device on the market. Available for all Day Mills except laboratory model.

**The J. H. DAY Co.**

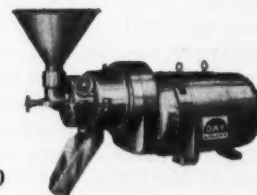
Division of The Cleveland Automatic Machine Co.

4952 Beech Street, Cincinnati 12, Ohio

MANUFACTURERS OF QUALITY MIXING, BLENDING, SIFTING, MILLING EQUIPMENT SINCE 1887

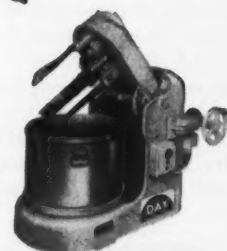
### DAY HY-R-SPEED MILLS

set the pace for grinding, dispersing and blending. No skilled operator required. Complete clean-up takes less than 5 minutes. Built in three sizes: 150-300 gal. per hr.; 100-200 gal. per hr.; 10-20 gal. per hr.



### DAY PONY MIXERS

assure speedy, thorough pre-mixing of vehicles and pigments. A model for every need or application — single motion and twin motion mixing action—working capacities from 3 to 125 gallons.



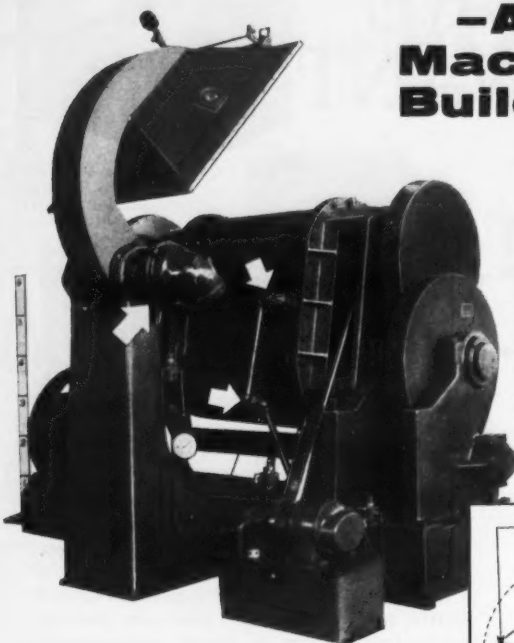
**The J. H. DAY Co.** Division of The Cleveland Automatic Machine Co.,

4952 BEECH STREET, CINCINNATI 12, OHIO

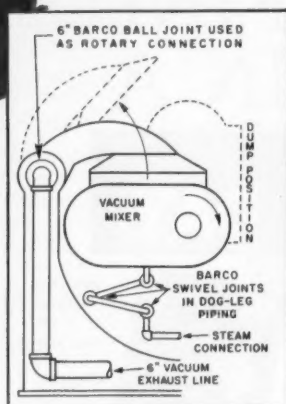
Check 3292 opposite last page.

# BARCO FLEXIBLE JOINTS

## -Aid Machine Builders!



**BAKER PERKINS, INC.**  
—On the big vacuum mixer shown at left (also see sketch below) a 6" Barco Ball Joint serves as a simple, dependable pivot point rotary vacuum connection to the movable hood of the tilting mixer trough. Below the mixer, three Barco Self-Aligning Swivel Joints are used to form a flexible "dog leg" steam piping connection.



## 3 TYPES OF JOINTS:

1. **SELF-ALIGNING SWIVEL JOINTS** for Dog Leg Reciprocating Swivel Movement.
2. **BARCO ROTARY JOINTS** for Continuous Rotation.
3. **FLEXIBLE BALL JOINTS** for Angular-Flex Movement and Alignment.

BAKER PERKINS, INC., Saginaw, Michigan, one of the world's leading builders of mixing equipment for chemical and process industries, is a long time user of Barco Swivel, Rotary, and Flexible Ball Joints. Here, as in other industries, designers of machinery have developed many ingenious, money-saving applications that FUNCTION PERFECTLY over long periods of time. One of the big advantages of these Barco Joints is that they have NO BALL BEARINGS—they handle steam at almost any required temperature (also many corrosive chemicals) without baking dry. NO LUBRICATION REQUIRED. When you need flexible piping connections on machinery, check with BARCO. Worldwide sales and service.



**BARCO MANUFACTURING CO.**

537C Hough Street

Barrington, Illinois

The Only Truly Complete Line of Flexible Ball, Swivel, Swing and Revolving Joints  
In Canada: The Holden Co., Ltd., Montreal

## FOR DESIGN ENGINEERS—



SEND for these interesting, helpful, illustrated bulletins:  
No. 310—"New Type C Barco Rotary Joints for Steam, Water, Hot Oil, Air, Gas, Chemicals."  
No. 265—"Barco Self-Aligning Swivel Joints." For service as high as 850 psi, and 750°-1000° F.  
No. 215—"Barco Flexible Ball Joints." All sizes 1/2" to 16".

## CHEMICAL BUSINESS

pable of producing linear as well as conventional polyethylene film in low and medium densities.

AviSun Corporation, formed by American Viscose Corporation and Sun Oil Company, has announced commercial production of high-clarity, high-strength polypropylene film. Polymer for film is being produced in company's 20-million-pound/year unit at Port Reading, New Jersey.

Century Chemical Corporation has brought company's gross annual sales to \$10 million by acquisition of Chemo Puro Mfg. Corp.; Oil & Chemical Terminals, Inc.; and Asphalt Division of Oil & Chemical Products, Inc.; in addition to Chemo Puro AG, a European sales organization.

Ethyl Corporation has increased its commercial capacity for aluminum alkyls and alkyl aluminum halides at their recently completed plant in Orangeburg, S.C. Multi-million-pound/year plant utilizes several methods to produce a variety of materials.

Pittsburgh Coke & Chemical Company is expanding its Neville Island, Pennsylvania, sulfuric-acid-plant capacity by 70%. Construction now under way is scheduled for completion soon.

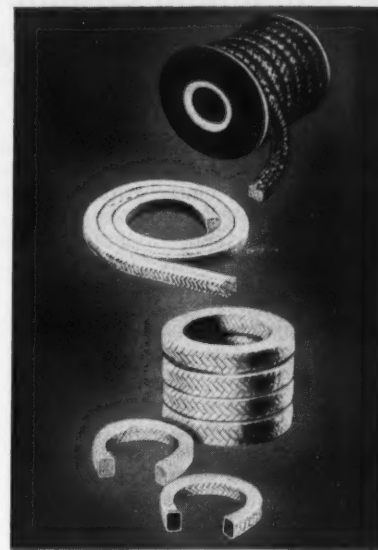
Celanese Corporation of America has announced acquisition of Royal Manufacturing Company Incorporated, a large independent manufacturer of plastic bottles and containers. This is latest step in continuing Celanese expansion and diversification in chemicals and plastics.

SunOlin Chemical Company plans to expand facilities in North Claymont, Delaware, to include manufacture of ethylene. They expect to have ultimate capacity of nearly 200-million-pounds/year, plant will cost approximately \$15 million.

Niagara Chemicals Division, Food Machinery and Chemicals Corporation has established facilities at South Haven, Michigan, for production of a wide range of pesticides.

To page 20

## CHEMPRO SQUARE-BRAIDED TEFLON\* PACKINGS



Chempro Square-Braided Teflon Packings are tough, strong and chemically inert. They outlast ordinary braided packing many times over, holding together longer against even the strongest acid, alkali or organic solvent. Here are four popular Chempro Square-Braided Teflon packings:

### STYLE No. 400 PACKING

Constructed of pure Chempro tape, braided square without lubrication. For highly corrosive services where a lubricant is undesirable.

### STYLE No. 400-F PACKING

Resilient, square-braided packing of Chempro Teflon multi-filament yarn, without lubrication. For pump and valve applications in highly corrosive services where the packing must "give" to a certain extent.

### STYLE No. 400-FI PACKING

Square-braided pack-

ing of Chempro Teflon multi-filament yarn and impregnated with Teflon suspensoid. This dense packing was developed for gas and vapor services where other lubricated packings were not acceptable.

### STYLE No. 400-FL PACKING

Made by square braiding Chempro Teflon multi-filament yarn and externally lubricating with a non-hardening and non-melting lubricant. Recommended for high speed applications and highly corrosive services, from freezing to 350° F.

These Chempro Braided Teflon packings are available in all sizes in standard 1/8" increments from 1/8" to 3/4" square—in spool or coil forms. Can be cut to specific ring sizes, if desired.

Write for revised Bulletin CP-552.

\*DuPont trademark



**CHEMICAL & POWER PRODUCTS, Inc.**

9 Broadway, New York 4, N. Y.

Check 3293 opposite last page.

Check 3294 opposite last page.

CHEMICAL PROCESSING

## THAT'S INTERESTING

### **Asphalt aids grass growth**

Covering grass seed beds with asphalt film can help cut soil moisture losses and may lead to alleviating dust bowl conditions, it has been announced by Esso Research and Engineering Company.

The film is formulated to last five or six weeks required for seed germination and break through.

### **Film speed jolted**

Strong electric field — about 4 v/cm — applied to photographic emulsion concurrently with light pulse dramatically increases both contrast and darkening in developed film. Discovery, says Jerome Rothstein, senior scientific executive at Edgerton, Germeshausen and Grier, Inc., Boston, may lead to emulsions which become light sensitive only when current applied.

For more information on product at right, specify 3295 see information request blank opposite last page.



## *Corrosion can't hide in this fluid end!*


You can easily detect corrosive action *before* breakdown with this Goulds Fig. 3715 centrifugal chemical pump.

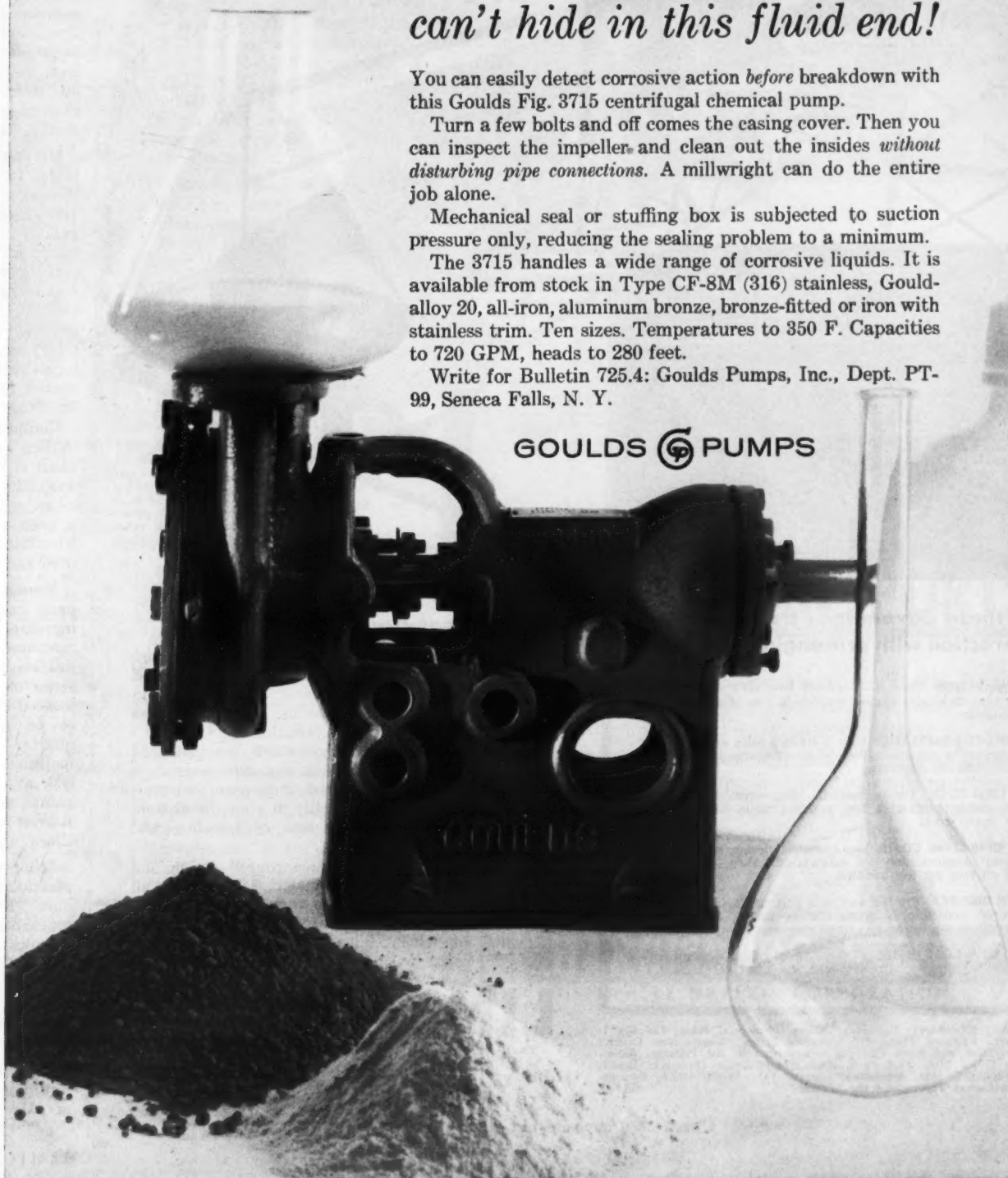
Turn a few bolts and off comes the casing cover. Then you can inspect the impeller and clean out the insides *without disturbing pipe connections*. A millwright can do the entire job alone.

Mechanical seal or stuffing box is subjected to suction pressure only, reducing the sealing problem to a minimum.

The 3715 handles a wide range of corrosive liquids. It is available from stock in Type CF-8M (316) stainless, Gould-alloy 20, all-iron, aluminum bronze, bronze-fitted or iron with stainless trim. Ten sizes. Temperatures to 350 F. Capacities to 720 GPM, heads to 280 feet.

Write for Bulletin 725.4: Goulds Pumps, Inc., Dept. PT-99, Seneca Falls, N. Y.

GOULDS  PUMPS





# Built tough

for round-the-clock service in grueling applications



Pre-Bilt conveyors are available in belt widths of 18, 24, 30 and 36 inches. Truss and channel structural frames are designed to AISE standards for spans up to 50 ft. Supporting bents, chutes and other accessories are standardized.

## All these advantages from selection to erection with pre-engineered units

**EASY SELECTION** from standardized Link-Belt components. Your Link-Belt sales engineer will help you select the right combination.

**ON-THE-SITE QUOTATIONS** by a trained sales engineer. He will prepare a prompt quotation on all components necessary for efficient operation.

**LOW FIRST COST.** Pre-engineered, shop-assembled components, prompt delivery, fast erection time—all result in lower initial costs.

**LOW OPERATING COSTS.** Due to rugged design, maintenance normally consists only of lubrication. More economical based on cost per ton handled.

**QUICK DELIVERY.** Pre-Bilt sectional belt conveyors are manufactured and shipped from one of nine plants located nearest your operations.

**FAST, LOW-COST INSTALLATION.** Simple construction facilitates field assembly, reducing time and costs of erection.

## LINK-BELT Pre-Bilt belt conveyors bring savings from the start

Speed, economical operation and dependability—conveying features required in every industry—are provided by Pre-Bilt Sectional Belt Conveyors. They stand up in the most rugged, full-time operations. And normally the only maintenance required is lubrication.

The same engineering design which has produced some of the world's outstanding conveyor systems is applied to Pre-Bilts. Standardized, shop-assembled components are selected to specifically fit your installation. Simple construction provides ease of handling and erection.

No other conveyor offers such rugged design and economy of operation in bulk materials handling. Call your nearby Link-Belt office for complete information. Or write for Catalog 2779, a new "Idea Book" for cutting costs with Link-Belt Pre-Bilt sectional belt conveyors.

**LINK-BELT**

BELT CONVEYOR EQUIPMENT

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Warehouses, District Sales Offices and Stock Carrying Distributors in All Principal Cities. Export Office New York 7; Australia, Marrickville (Sydney); Brazil, São Paulo; Canada, Scarboro (Toronto 13); South Africa, Springs. Representatives Throughout the World. 15,193

Check 3296 opposite last page.

## CHEMICAL BUSINESS

From page 18

Facilities will provide faster more flexible service to customers in the area, and make possible custom blending of formulations to meet local conditions.

**Dow Chemical Company**, will construct a phenol plant with capacity of 36-million-pound/year at a location to be selected in Pacific Northwest. Operations are expected to begin early in 1961, and is first step in plant development of an integrated chemical and plastics manufacturing operation in this area.

**Hercules Powder Company** plans to expand facilities at Hercules, California, to provide production of 8-million gallons of methanol; 50-million pounds of formaldehyde; and 11,000 tons of urea-formaldehyde compositions per year. Urea-formaldehyde facilities will be completed by mid-year, with methanol-formaldehyde facilities expected to be on stream early in 1961.

Company also plans a multi-million dollar polypropylene plant at Lake Charles, Louisiana. Ultimate capacity will be in excess of 100-million pounds a year with a completion of 50-million-pound unit scheduled for early 1961.

**Monsanto Chemical Company** has announced plans to increase production of styrene monomer by at least 200-million pounds a year. First stage of new facilities, to be located in Texas, is expected to be in operation by first quarter of 1961. Additional facilities to produce Lytron 680, an acrylic-binder for latex paints, are being installed at Addyston, Ohio, and Santa Clara, California.

**Minnesota Mining and Manufacturing Company** will produce "Kel-F" brand halofluorocarbon and other specialty chemical products at a \$4.5-million facility being constructed on a 500-acre tract along the Tennessee River. Scheduled for completion in early 1961.

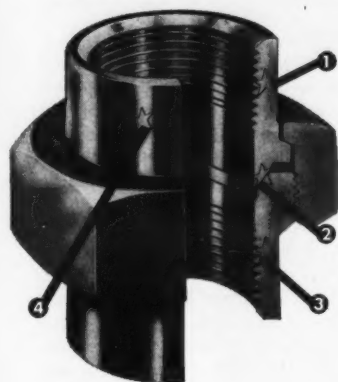
**Ohio Chemical & Surgical Equipment Company**, Division of Air Reduction Company,

CHEMICAL PROCESSING



# only CATAWISSA

*gives you all these  
features for your  
forged steel pipe  
union requirements*



1. Uniform walls for even expansion and contraction under temperature changes. They follow the pipe!

2. Catawissa Ball-to-Angle Seats give you a "Perfect Seal" regardless of pipe alignment!

3. More than adequate wall thicknesses give you Catawissa's 3-to-1 Safety Factor (3000-lb. service, 9000-lb. test; 6000-lb. service, 18000-lb. test)!

4. Round, straight barrels for fast wrenching. No uneven or tapered surfaces to cause wrench slips or wrench locking!

Catawissa Perfect Seal Pipe Unions are made by Union Specialists from 80,000 lb. tensile strength steel (ASTM Spec. A-105-55T, Grade II). Steel forgings from our own forging mill are closely checked for imperfections . . . and finishing on modern, automatic machines with close inspection during and after production give you pipe unions second to none!

Write for Catalog 58 showing the complete Catawissa line of Perfect Seal Products.

*for complete, guaranteed satisfaction*

*always specify*  
**CATAWISSA**

**CATAWISSA VALVE & FITTINGS CO.**  
CATAWISSA • PENNSYLVANIA

Check 3297 opposite last page.

FEBRUARY 1960

## CHEMICAL BUSINESS

Inc., recently broke ground for construction of an air separation plant at Baton Rouge, Louisiana. Plant, which will cost over \$2-million, will have a production capacity of 30 tons of liquid oxygen, nitrogen and argon per day. Completion is scheduled for early this year.

Borden Chemical Company has announced completion of a new pilot plant, first step in \$2.5-million expansion program at Leominster, Massachusetts. Unit is designed to produce up to 1000-pound lots of polyvinyl alcohol, polyvinyl acetate, acrylics, butadiene-styrene and other products.

Dixon Chemical Industries, Inc. has opened a \$5-million plant capable of producing 300,000 tons of sulfuric acid a year. Late this year, company expects to start up a \$4-million hydrofluoric acid plant on the Dixon 70-acre industrial site at Paulsboro, N. J.

Linde Company, Division of Union Carbide Corporation, has a liquid hydrogen facility at Tonawanda, New York, laboratories, capable of producing more than 25,000 liters/month. Unit will produce hydrogen with a minimum of 95% parahydrogen.

Naugatuck Chemical Division, United States Rubber Co., plans large-scale production of Flexzone 3-C (N-isopropyl-N'-phenyl p-phenylene diamine). Unit will be constructed at Naugatuck, Connecticut, and is scheduled to begin operation near the end of the year.

Ashland Oil & Refining Company has announced plans to construct a commercial hydrodealkylation plant to produce synthetic benzene and naphthalene from petroleum. Unit, to be constructed at Ashland Oil's, Buffalo, New York, refinery, will produce a maximum of 12-million gallons per year of benzene or 50-million pounds of naphthalene.

Stauffer Chemical Company plans to construct a carbon bisulfide plant at Delaware City, Delaware. Completion is scheduled for November 1960.



**WHERE  
YOU  
WANT  
IT**

**FAST** ←



**GAS TRANSPORTS**

Around the clock around the nation — Taylor-Wharton Gas Transports put mobility in your gas stores moving your gas to where you need it, when you need it.

Utilizing a special trailer with either single or tandem axle chassis, upon which are mounted various numbers of pressure vessels (depending upon the gas capacity desired). Large quantities of gas can easily be moved about or put into semi permanent storage.

More than a Century in Harrisburg 24, Pa.



**HARRISBURG STEEL CO.**

Division of HARSCO CORPORATION



CYLINDERS



TUBES



FLANGES



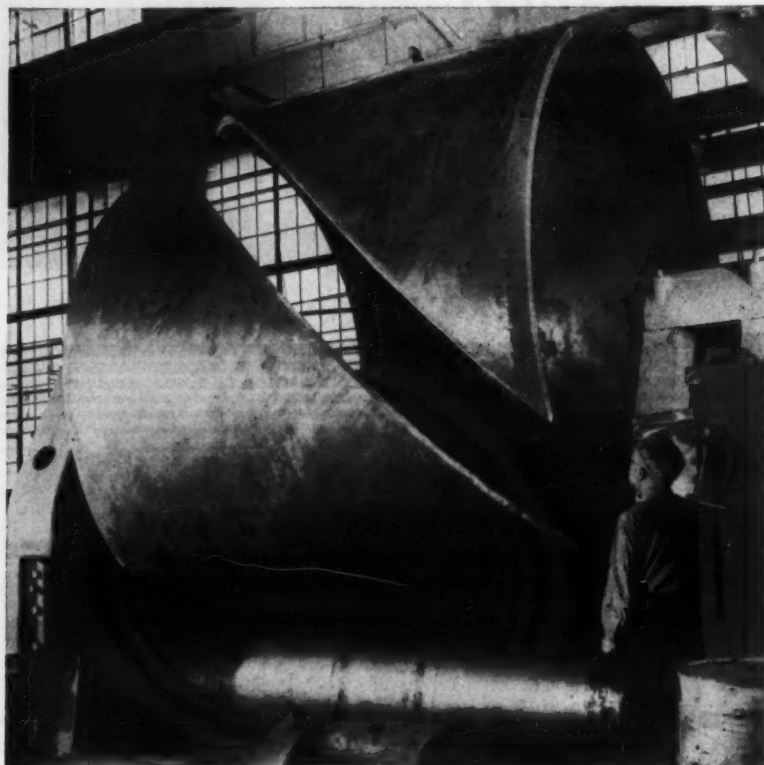
COUPLINGS

Check 3298 opposite last page.



# BIG BRONZE PLATE!

Varying dimensions —  
up to 10,000 lbs. in weight



## Here's an idea of what you can get in AMPco® METAL

A single Ampco Metal plate can be big enough ( $\frac{1}{2}$ " x 192" x 360") to form a tank 16' high x 11'-6" diameter! Big enough (1" x 180" x 240") to form a tank 15' long x 5'-3" diameter! An Ampco Metal Tube Sheet 2" thick can be rolled 10'-6" in diameter. One 3" thick can be 9'-0" in diameter.

What are your requirements for corrosion, abrasion, or mechanical service? Talk it over with your Ampco field engineer. Write for bulletin.

G-23

# AMPco METAL

AMPco METAL, INC.  
Dept. 1308, Milwaukee 46, Wis.  
West Coast plant: Burbank, California  
Southwest plant: Garland (Dallas County), Texas

Check 3299 opposite last page.

Chicago Section of AIChE finalizes plans for one-day symposium. Subjects up for discussion will be . . .

- *Computer process control*
- *Engineering economics*

CP Editor Vaaler to participate as moderator

TWO concurrent technical sessions — one dealing with computer control of chemical processes, the other with the subject of economics and the engineer — have been scheduled for the one-day symposium to be held in Chicago this month. Sponsored by the American Institute of Chemical Engineers' oldest local section, Chicago, the meeting will take place in the Palmer House on Tuesday, February 23, 1960. Technical sessions will run from 1 to 5 PM. They will be followed by a social period and banquet.

Each of the two programs has been planned around four prepared technical papers. Appropriate discussion periods will follow each presentation.

CHEMICAL PROCESSING magazine's editor, John C. Vaaler, will act as moderator during the computer session. Key engineering personnel from Du Pont, B. F. Goodrich, Fox-

boro Company, and Brown Instrument Company will participate in this program. Representing both user and supplier, these men will discuss patterns of computer control and cite actual operating experiences.

Such a question as: what can a computer be expected to accomplish and what should be computed to get better plant operation, will be answered. The experts will also attempt to take the mystery out of computer control terminology.

Basic objective of the economics session is to promote understanding and appreciation of the role that industrial economics and financial matters play in the job of a chemical engineer. Moderated by W. D. McEachron, head, Long-range Planning Group, Standard Oil Company (Indiana), this program will also feature experts from leading

To page 24



Symposium's computer process control session will be moderated by CHEMICAL PROCESSING editor, John C. Vaaler



W. D. McEachron, head of Standard Oil Company's Long-range Planning Group, will guide the economics session of the meeting



**THAT'S  
INTERESTING**

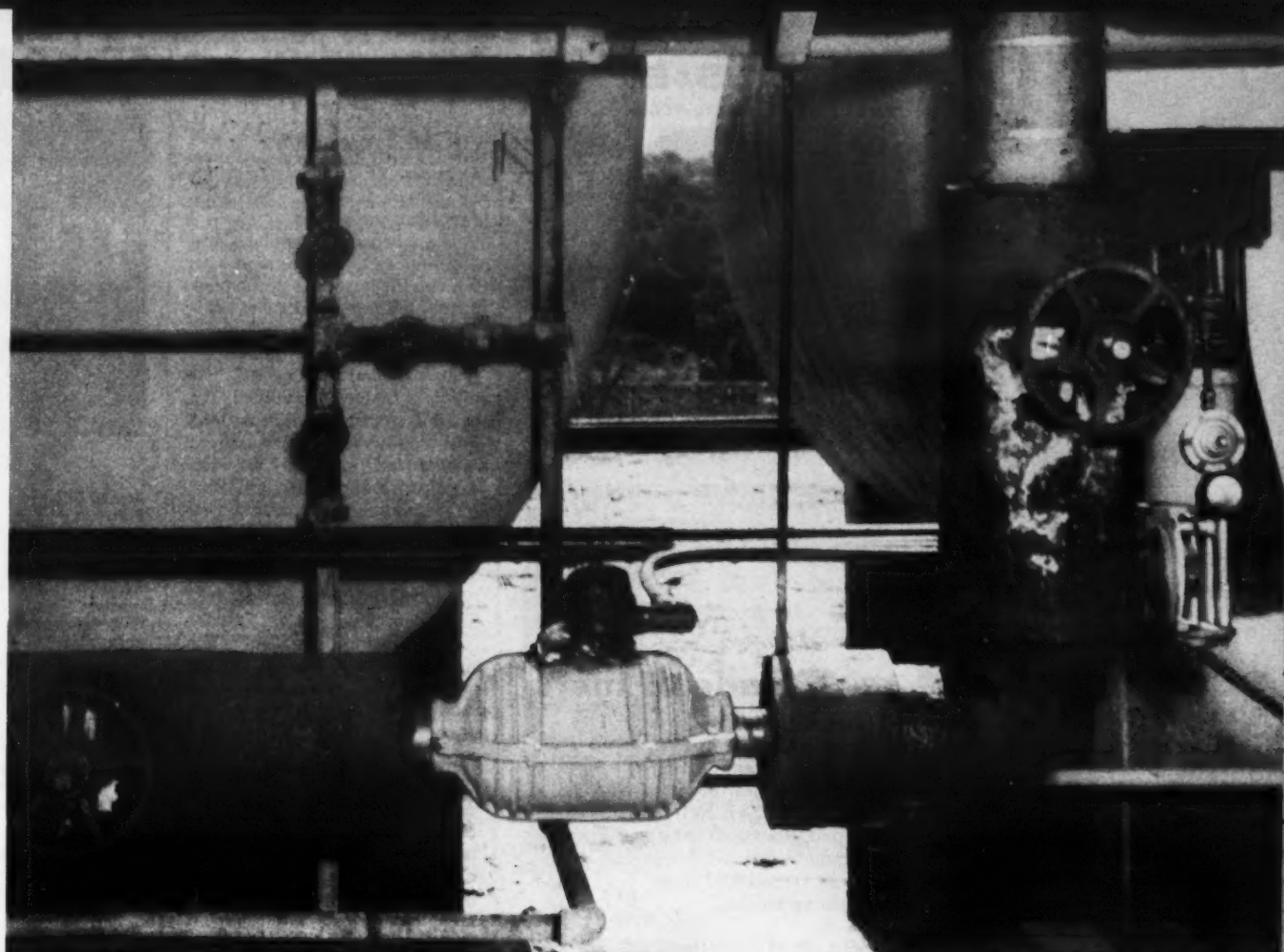
### Quick freeze

Temperatures as low as  $-350^{\circ}\text{F}$  are produced by a thumb-size refrigeration unit that uses expanding helium. The unit increases the sensitivity of infrared detection instruments used in the missile field.

### Unsin-tered sinners

If a Titusville, Pa., preacher's theory of the origin of oil has any basis, sinners have been getting a much cooler reception in a certain place since 1860. The clergyman, according to Hildegard Dolson in *The Great Eldorado* (Random House) told Col. Edwin L. Drake after his well came in, "Don't you know that you're interfering with the Almighty...? He put that oil in the bowels of earth to heat the fires of Hell. Would you thwart the Almighty and let sinners go unpunished?"

For more information on product at right, specify 3300 see information request blank opposite last page.



One of six Foxboro Magnetic Meters at International Salt Company's Avery Island Refinery. Meters are measuring  $220^{\circ}\text{F}$  sodium chloride brine being discharged from filters on International's Recrystallizer Process.

## Foxboro Magnetic Flow Meters handle $220^{\circ}\text{F}$ salt brine just like water!



Foxboro Dynalog Instrument indicates flow rate through any one of the 6 Magnetic Meters — at the flip of a switch.

### "trouble-free" — International Salt reports

$220^{\circ}\text{F}$  — that's the temperature of sodium chloride brine as it leaves filters at International Salt Company's Avery Island Refinery in Louisiana. And their 6 Foxboro Magnetic Meters have been providing continuous, trouble-free flow measurement of this highly corrosive liquid for over a year.

These meters easily handle this punishing chemical. They're lined with corrosion-proof Kel-F — have no flow restrictions of any type. Linear meas-

urement — accurate to  $\pm 1\%$  across the entire scale — is indicated on remote Foxboro Dynalog\* instruments.

Since its introduction 5 years ago, the Foxboro Magnetic Meter has simplified the measurement of difficult liquids in hundreds of industrial processes. Ask your nearby Foxboro Field Engineer how it can help your process. Or write for Bulletin 20-14. The Foxboro Company, 812 Norfolk Street, Foxboro, Massachusetts.

\*Reg. U. S. Pat. Off.

# FOXBORO

REG. U. S. PAT. OFF.



**BS&B Safety Heads**  
The "CIRCUIT BREAKER" of Pressured Systems

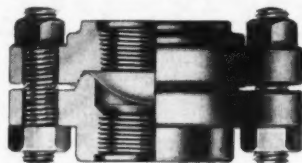
*Tranquilizer* ...made of metal

**You don't swallow this "tranquilizer"...** but it can bring you priceless peace of mind! It's the rupture disc in a BS&B Safety Head—one of thousands upon thousands that protect personnel and equipment against dangerous pressure build-ups in vessels and lines containing air, gases or liquids.

**When pressures rise** above predetermined safe limits, this disc ruptures to provide instantaneous, unrestricted relief. BS&B designs discs to rupture at any specified pressure from 3 to 100,000 pounds per square inch. They are supplied in sizes ranging from 3/4-inch to 36 inches diameter, and in special sizes to virtually any specification.

**BS&B SAFETY HEADS** protect pressure systems in every type of industry

Thousands of BS&B Safety Heads have been in use for the past 26 years in virtually every type of industry where pressure protection is a problem. If your responsibility includes the safe operation of pressured systems in your plant, why not let us tell you more about BS&B Safety Heads?



**BLACK, SIVALLS & BRYSON, INC.**

manufacturers of diaphragm valves, controllers, regulators, safety heads.  
Dept. 2-M2  
7500 East 12th St.  
Kansas City 26, Mo.

Check 3301 opposite last page.

**CHEMICAL BUSINESS**

**AICHE Symposium**

From page 22

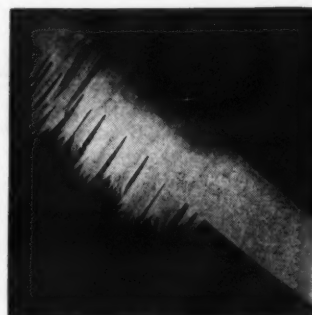
chemical companies.

The broad financial and economical environment in which the process industries must operate will be discussed. Methods used to appraise and relate numerous technical, marketing, and economic factors involved in overall project evaluations will also be covered.

Featured speaker for the evening's banquet will be Dr. R. C. Gunness, executive vice president and director, Standard Oil Company (Indiana). Topic of his talk will be: "Who Reaps the Benefits of Technical Progress?"

Registration fee for the meeting is \$3.00 (\$1.00 for students). Social period and banquet, \$5.00.

(Further information about the symposium may be obtained by contacting the general chairman, R. S. McDaniel, Supervisor, Light Oils Manufacturing Department, Standard Oil Company (Indiana), 910 S. Michigan Avenue, Chicago 80, Illinois.)



**Disposable toothbrush molded of polyethylene**

Plastics have invaded the dentifrice market, and now there is available a disposable toothbrush designed to be used once, then thrown away.

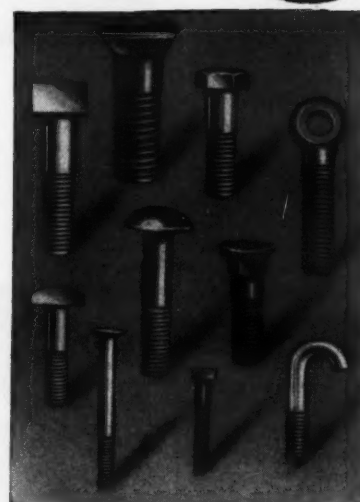
It comes to the user hermetically sealed in a sanitary package, already charged with dentifrice. The brush is molded in one piece of Celanese Corporation of America's linear polyethylene. Bristles

**Threaded Specialties**

lower cost  
**TEE BOLTS**  
by an  
exclusive method

Among Pawtucket's many specialty products are these lower-cost tee-head bolts. Pawtucket's exclusive production method keeps cost low, dimensional accuracy unusually high and strength above standard. Pawtucket tee head bolts are made in standard sizes 1/4" and larger, or to your specifications. In any size, you can depend on a uniform Class 3 fit, if required.

All standard steels, stainless steels and non-ferrous metals, including Titanium



BETTER BOLTS SINCE 1882

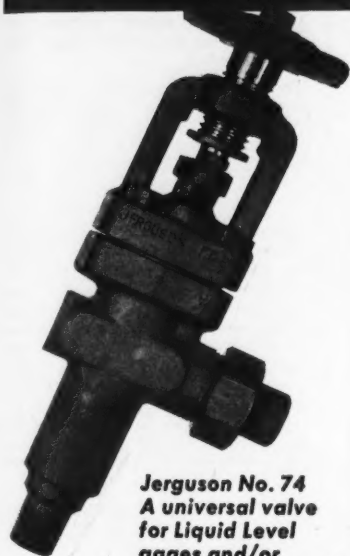
**PAWTUCKET**

MANUFACTURING COMPANY  
327 Pine St. Pawtucket, R. I.  
THE PLACE TO SOLVE YOUR BOLT PROBLEMS.  
T.M. REG.  
The Bolt Man

Check 3302 opposite last page.

**CHEMICAL PROCESSING**

## Here is a NEW Jerguson ALL-PURPOSE ANGLE VALVE



**Jerguson No. 74**  
A universal valve  
for Liquid Level  
gages and/or  
Instrument Piping  
and General Use

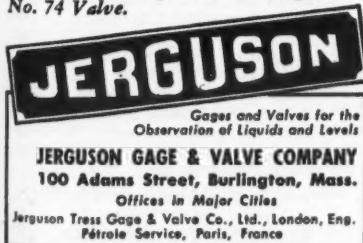
This unique New Angle Valve has unusual advantages. A universal valve, ideal for liquid level gages . . . simply add our pipe plug with integral bleed (No. 74G) for the ideal valve for instrument piping and general use.

**Combines Advantages of single-piece** forged body and bonnet flange, simplified OS&Y bonnet and reciprocating stem in one valve.

**Forged yoke** supports stem away from valve body; separate forged gland-follower bears on packing, independent of yoke. Stem thread outside, not affected by temperature or liquid. Stem works freely, no chance of freezing.

**Reciprocating Backseating Stem:** Works in to-and-fro motion with no rotating action; gives perfect seating, eliminates wear from galling. Backseating eliminates packing contamination from liquid; can be repacked under pressure. Teflon seating available.

Write for catalog sheet on Jerguson No. 74 Valve.



Check 3303 opposite last page.

## CHEMICAL BUSINESS

look like those of a conventional toothbrush, are sufficiently rigid to clean and remove food particles effectively but still are flexible enough to massage gums without irritation.

During packaging, the toothbrush and dentifrice are sanitized. The package has an estimated shelf life of 18 months.

The toothbrush, developed by Progressive Engineering and Developing Co., was introduced by Flex-I-Brush Corp., Lodi, New Jersey.

### Insects dine heartily on clean clothes, too

Ladies, you can stop rushing to the cleaners with soiled clothes to protect them from insects. The rascals, tests show, like clean woolens as well as those speckled with gravy, tomato juice, butter, etc.

Scientists at Gulf Oil Research Center's entomological laboratory have discovered that a clean wool menu is eaten with relish by the large larvae of the black carpet beetle and furniture carpet beetle.

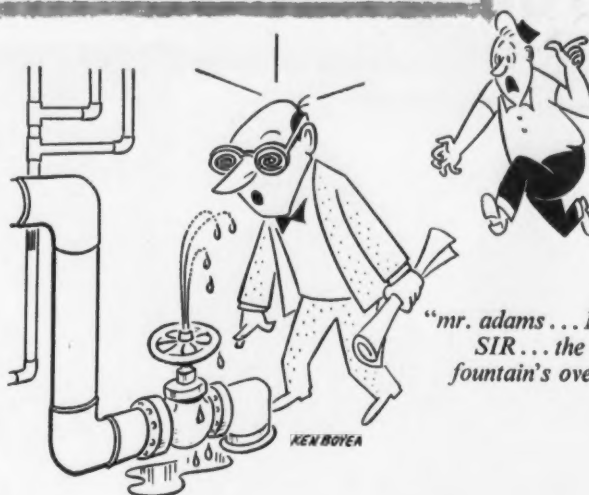
Findings establish that, except for eliminating insects which previously infested wool, cleaning cannot provide a future guarantee from pest attacks.

### New lens to 'capture' all visible light colors

An improved optical formula devised in Kodak's Research Laboratories gives promise to the development of a "superchromat" lens which would be the first ever to be corrected for all colors of visible light.

A three-element lens, made with three glasses chosen from a graph based on the new formula, is corrected for light from the ultraviolet to the infrared, or from 365 to 1,010 millimicrons. With this type of lens, images of all colors are in perfect register.

## Life in these excited states...



"mr. adams... Mr. Adams...  
SIR... the water  
fountain's over here!"

## Why men of vision choose ACE equipment

Men with a weakness for profits somehow manage to keep equipment "on stream" full time with no corrosion shutdowns. You'll find they reach for Ace corrosion-engineered equipment time and again. Now nine kinds of Ace pipe . . . plus pumps, valves, tanks, and special equipment to solve most any corrosion or contamination problem.

### "WAM" PUMP finest you can buy



Highest pumping efficiency, with faultless corrosion resistance. Hard rubber casing and impeller; Hastelloy C shaft. 80 gpm. *Bul. CE-55.*

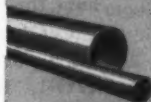
### THRIFTY- THROATED VALVES



Liquids never touch metal in Ace diaphragm valves! Rubber or plastic-lined cast iron, or solid plastic bodies. Sizes 1/2 to 6". Ask for facts.

### ACE-ITE

all-purpose toughness



High-impact, rubber-plastic, most economical for average chemicals. 1/2 to 6". Screw or solvent welded fittings. Valves 1/2 to 2". NSF-approved. *Bul. 80A.*

### RIVICLOR

angleless strength



All-purpose rigid PVC. Sched. 40, 80 & 120, 1/2 to 4". Threaded or socket-weld fittings. Valves 1/2 to 2". NSF-approved. *Free Bul. CE-56.*



# ACE

processing equipment of rubber and plastics

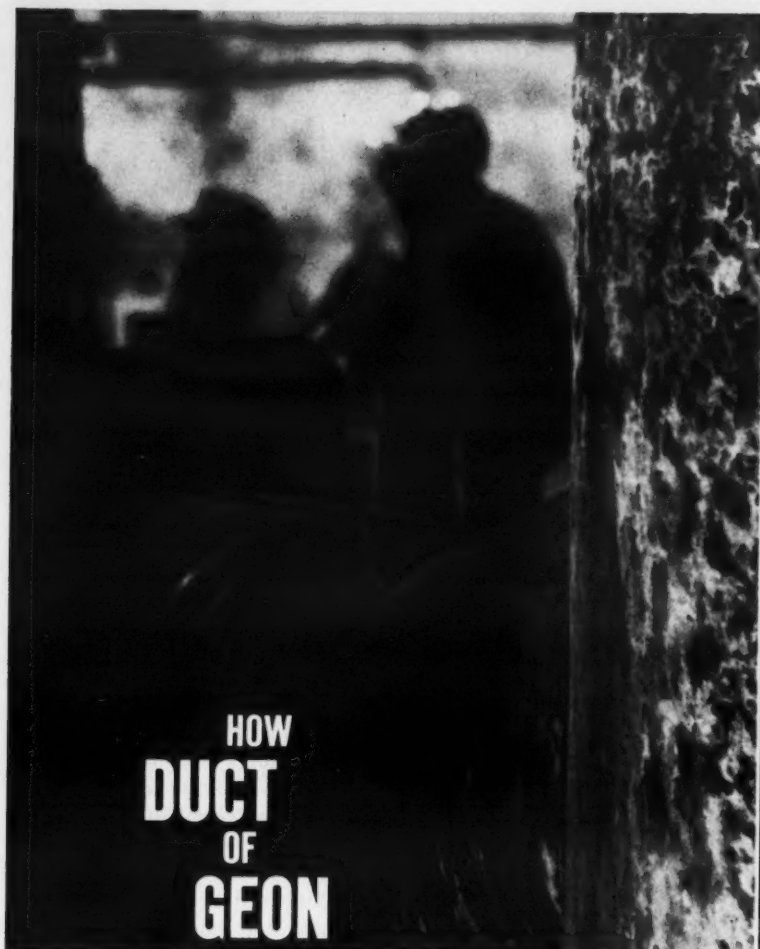
**AMERICAN HARD RUBBER COMPANY**  
DIVISION OF AMERACE CORPORATION  
Ace Road • Butler, New Jersey

Check 3304 opposite last page.



Another new development using

# B.F. Goodrich Chemical raw materials



## CONQUERS CORROSION IN CHLORINATION ROOM

A tougher corrosion problem than this one would be hard to find. That's why all the large round duct you see is fabricated from rigid sheet made of Geon vinyl.

This room is where spent gases are carried from chlorinating operations to storage tanks. The atmosphere is such that personnel must wear goggles and face masks at all times. Corrosion would make short work of most ductwork or pipe.

But Geon is unaffected by acids, oils or many hydrocarbon chemicals. It is easy to fabricate, light in weight,

and simple to install. Duct, pipe—even complete fans and valves—made of Geon are solving corrosion problems throughout industry.

For more information on products made of Geon vinyl—or on this versatile material itself—write Dept. G O-1, B.F. Goodrich Chemical Company, 3135 Euclid Avenue, Cleveland 15, Ohio. Cable address: Goodchemco. In Canada: Kitchener, Ontario.



**B.F. Goodrich Chemical Company**  
a division of The B.F. Goodrich Company



GEON vinyls • HYCAR rubber and latex • GOOD-RITE chemicals and plasticizers

Check 3305 opposite last page.



### recent books

**Chemical engineering plant design** is topic of revised book. The fourth edition consists of 534 pages and is designed for both the student and the professional chemical engineer. Of the 118 illustrations, all but 22 are new. Many standard graphic design symbols and aids have been added. Flow sheets, pictures of models, and assembled plans are also included.

To obtain "Chemical Engineering Plant Design" remit \$12.00 direct to McGraw-Hill Book Company, Inc., 330 West 42nd St., New York 36, N.Y.

**Thermodynamics** — as applied to chemical processing — is subject of 1072 page book written by Hougen, Watson, Ragatz. Theoretical development and practical applications are discussed. Revised to reflect recent technological advances, this second edition includes considerable new material. Priced at \$9.75, *Chemical Process Principles, Part Two: Thermodynamics*, is published by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y.

Check 3306 opposite last page.

**"Phenolic Resins,"** by David F. Gould, Consultant to The Borden Chemical Company, is a concise presentation of the raw materials, production methods, and applications of this group of resins. Book emphasizes the practical features, including commercial and economic considerations. Discussion of the chemistry and reaction mechanisms of these resins is held to a minimum. Disclosures in patents and elsewhere have been selected frequently to illustrate trends of thinking in the development of resins, processes, and applications.

To obtain "Phenolic Resins" remit \$5.75 to Reinhold Publishing Corporation, 430 Park Avenue, New York 22, N.Y.

**Analytical chemistry**, a comprehensive account in three parts begins with this 810-page volume I, Part I, "Theory And Practice". This first of a many-volume work was edited by I. M. Kolthoff, University of Minnesota and Philip J. Elving, University of Michigan. It is divided in two sections: Section A — Analytical Chemistry; its objectives, functions, and limitations. Section B — Application of Chemical Principles. Aims and objectives of this treatise are to present a concise, critical, comprehensive and systematic treatment of all aspects of classical and modern analytical chemistry.

To obtain "Analytical Chemistry, Volume I, Part I" remit \$17.50 to Interscience Publishers, Inc., 250 Fifth Avenue, New York 1, N. Y.

Check 3307 opposite last page.

In selecting your  
chemical distributors



## Check These 'Character Factors'

### JOHN O. LOGAN

Vice President  
Olin Mathieson Chemical Corporation

Chemical distributors cannot be all things to all producers. Wherever distributors are used they must blend with the producers' own marketing activities to provide a harmonious sales team. Distributor choice should not be hasty. Likewise, distributors should enter such a relationship only after being convinced that a marketing partnership of long duration will prove profitable for both parties.

In the October issue of *CHEMICAL PROCESSING*, Mr. F. Dean Hildebrandt listed eight services the distributor has to offer.\* This is a good outline. Nevertheless, it must be emphasized that not all distributors provide these services. In many cases the producer won't need all the services to be provided, in view of his own efforts. But producer and distributor services should jointly give complete and effective market coverage.

These basic distributor "character" factors can aid the producer in his selection:

- 1) Business reputation of the distributor and its management and ownership personnel.
- 2) The age, vitality and know-how of the key

people in the distributor organization.

- 3) Financial position—earnings, capitalization, rate of growth, etc.
- 4) The merchandising policies and practices.

### Producer-distributor Relationships

Reaching a decision is only the beginning. One real obstacle to long-range effectiveness is uncertainty as to what is expected of each party. Properly initiating a relationship calls for a thorough spelling-out of anticipated performances. While a "gentlemen's agreement" is desirable, changes in personnel and circumstances make it highly desirable to have a permanent record of the understanding. This should be complete in pertinent details and modified from time to time as circumstances dictate.

Having been started with a complete understanding, the producer-distributor relationship requires constant nourishment. This is a two-way street calling for effort by both parties. Frequent meetings at the local level and regular meetings of executive personnel are necessary to keep policies and problems clarified and information flowing in both directions.

Both producer and distributor are in business to make money. Any situation which penalizes the earnings of either partner should be the concern

of the other. It is not always possible to adjust combined revenues to the level needed to give both producer and distributor the desired return. Such situations should, however, be recognized and shared to the extent practical until corrective measures can be taken.

The distributor needs ample sales and service support in terms of men, product advertising and promotion material. Also necessary are technical data on new products and applications. To see that this is accomplished our company is in the process of setting up a Distributor Headquarters in the home office. Selection and support of distributors will be coordinated from this spot. There will thus be a focal point for all distributor problems. This does not eliminate the local contact but is designed to make it more effective and helpful.

### Taboos

Distributors are generally smaller organizations than the producers they serve. This means a distributor can do certain things a larger organization cannot do as effectively. It may be quicker action on emergency deliveries, shipment of mixed lots, assumption of local credit risks or many other things. This ability should not be considered a license to do some things which most producers will find

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\*See "Chemical Distributor Strong Link Between Producer and Consumer," CP, October, 1959, page 24.



**KENDALL GREENE**, Director of Economics and Planning for Goodrich-Gulf Chemicals, Inc., has held that position since March of 1959. During the preceding eight years Mr. Greene was associated with the Petrochemicals Dept. of Gulf Oil Corporation at Pittsburgh where he served as Director of Commercial Research.

He is a graduate of Georgia Tech with a Bachelor's degree in Chemical Engineering, and holds a Master's degree in Business Administration from Harvard Business School. Mr. Greene is a member of Chemical Market Research Association and American Chemical Society.



**PAUL W. CORNELL**, Vice President in charge of Operations, Engineering and Research, for Goodrich-Gulf Chemicals, Inc., received his BChE. from Rensselaer Polytechnic Institute. He was formerly associated with the Petrochemicals Dept. of Gulf Oil Corporation, Pittsburgh. A member of the Goodrich-Gulf organization since its incorporation in 1952, Mr. Cornell is also a member of the Board of Directors of that company. He is a member of ACS and AIChE.

# Synthetic Rubber: 1965

**A looming natural-rubber shortage which cannot be completely handled by presently established synthetics is sparking interest in the world of polyisoprene, polybutadiene and beyond**

**KENDALL GREENE**

and

**PAUL W. CORNELL**

Director of Economics and Planning

Vice President

Operations, Engineering and Research

Goodrich-Gulf Chemicals, Inc.

The synthetic-elastomer industry is big. In 1959 it produced roughly 1¼ million long tons of rubber. Of this, over a million tons will be consumed in the U. S. and slightly less than ¼ million tons will be exported. In comparison it can be noted that plastic consumption in the U.S. for 1959 was about 5 billion lb, only a little over twice the 2.4-billion-lb synthetic-rubber figure.

What will the synthetic-rubber situation be in 1965? The key factors influencing this picture are 1) trends in the present major synthetics and 2) the supply-demand relationship in the natural-rubber field.

## Major Synthetics

Relative rank of the major synthetics is illustrated by Figure 1. Not included here are the important but small-in-poundage specialties. These include polyurethanes, silicones, chlorosulfonated polyethylenes, fluorinated rubbers and polysulfides, among others. Upward growth in the U.S. of new-rubber consumption has been 4.3% per year. In the last 10 years, this has dropped off to about 3.5%. These trends, along with that of the emer-

gence of synthetics to the forefront, are shown in Figure 2.

Styrene-butadiene rubber (SBR) has improved considerably since the war. Major advances were the cold-rubber process and the oil-extension principle. More recent developments are improvement in color, better methods of carbon-black dispersion in black masterbatch, and improvements in carbon blacks, antioxidants and other rubber chemicals.

SBR's price advantage has tended to obscure these improvements. SBR will continue to improve, thus increasing its share of the market.

The SBR future should include increased use of carbon-black masterbatch. This is due to cost savings to the rubber-products manufacturer and improved quality of masterbatch over dry-mixed carbon black.

Oil extension will enable tire manufacturers to obtain softer, quieter-riding tires. At the same time, tread wear can be improved by use of finer, better-dispersed carbon black. These and economic considerations will increase use of oil-black masterbatch.

The all-butyl tire has achieved some initial accept-

ance in passenger tires. However, SBR has certain basic economic advantages and is already being compounded to meet an increasing demand for a softer, quieter ride. Accordingly, butyl will find a market primarily as a premium tire in the passenger field. As such it will not cut appreciably into the large-volume SBR markets.

Butyl is finding increasing use in wire and cable applications, automotive extrusions and other specialty areas. The inner tube is still a major market. Halogenated butyl is expected to broaden the uses of this versatile polymer. Growth should increase at a rate of about 7% per year through 1965.

Despite butyl's resurgence, the chloroprene rubber, neoprene, is still the second-ranking synthetic rubber in volume. It is the oldest commercial synthetic rubber and is still finding new applications.

Neoprene's position as an important synthetic elastomer derives primarily from its generally good physical properties, in addition to its good resistance to oil and grease, sunlight, ozone, heat and flame. At a price of about 41c/lb, neoprene moves to



markets primarily in industrial uses and as components of household items.

The neoprene process is relatively expensive, precluding any significant price drops. Thus, neoprene tends to lose markets as other lower priced synthetic rubbers and plastics improve in quality. However, new markets are still developing faster than old ones are lost. Therefore a reasonable projection for the next five years is 2 to 3% growth per year.

N-type rubber is a butadiene-acrylonitrile series of polymers. They are primarily known for resistance to oil, solvents, heat and abrasion. A major advantage is the retention of good physical properties in contact with oil. These polymers find uses in fuel hose, fuel-cell liners, printing rolls and specialty gaskets for abusive conditions, among others. Despite its premium price of 49c/lb, N-type rubber continues to grow at a healthy rate. Growth in the range of about 5% per year can be expected through 1965.

#### Natural Rubber Supply

The supply of natural rubber in 1965 could be as high as 2,230,000 tons or as low as 2,110,000 tons. The sale of at least 60,000 tons per year from government stockpiles has been allowed for. The variation results from questions concerning the yield from new plantings, political stability of growing areas, etc. Despite recent publicity on hormone injections, planting of high-yield trees and other measures to increase natural-rubber production, it appears that these factors will not result in large increases in supply. This conclusion is based on the fact that Indonesia's production has declined since 1951 and tended to offset gains in other producing countries, principally Malaya.\*

On the world demand for natural rubber in 1965, a range of 2,280,000 tons to 2,500,000

tons seems reasonable — only  $\pm 5\%$  from the midpoint but admittedly a big variation in tons. Basic assumptions are:

- 1) The rate of world new-rubber demand will vary from 4 to 5.5% per year. The really uncertain factor here is the growth in demand in the rest of the world. (The U.S. demand trend is based on fairly reliable indicators.) Growth in new-rubber consumption in other major countries is proceeding at a very high rate and should continue.
- 2) The U.S. demand will require 34.5% natural rubber or its equivalent. With spot natural-rubber prices at their highest levels in years, U.S. rubber consumers are putting as much SBR into use as they can. We probably cannot consume much more synthetic until types with natural-rubber characteristics become widely available.
- 3) Approximately 55 to 60% of rubber demand in the free world outside USA will require natural rubber or the equivalent. Today the rest of the free world uses about 72% natural rubber.
- 4) Iron-curtain requirements will be 500,000 tons. This estimate is based on the assumption that no major economic policy changes will occur (e.g., more automobiles for the workers).

On the basis of these figures, the world will be short of natural rubber or its equivalent in 1965. The extent of this shortage may be as low as 50,000 tons or as high as 390,000 tons.

#### Polyisoprene and Polybutadiene

The variation in these natural-rubber supply-demand estimates highlights the dilemma of those contemplating major production of polyisoprene or polybutadiene rubbers. (These two types are

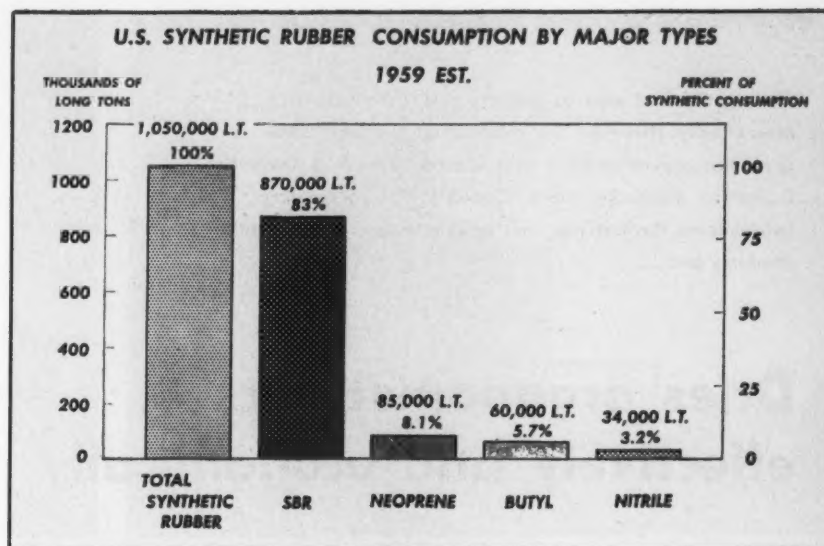


FIGURE 1

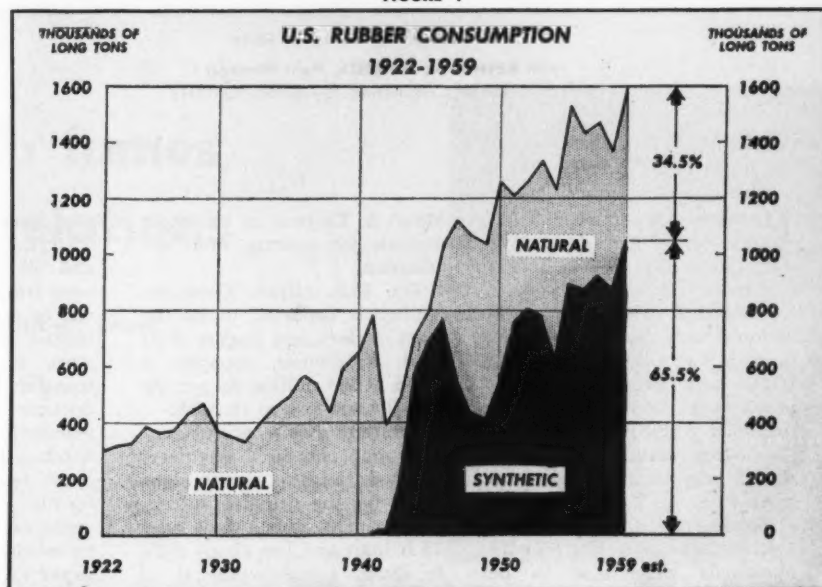


FIGURE 2

considered front-runners as replacements for natural rubber.)

The polyisoprene types are under development by most of the major rubber companies. Shell is marketing semi-commercial production of 5 tons per day. They have a 20,000-ton-per-year plant scheduled for completion in 1960. Firestone is reported to be building a plant which can produce either polyiso-

prene or polybutadiene. Goodrich-Gulf, Goodyear and Texas-US have not announced commercial plans, as of this writing. Others are undoubtedly working on polyisoprene.

Polybutadiene rubbers are being developed by many of the same companies listed above. Phillips has semi-commercial quantities on the market. Several companies are

To page 77

\*See "A 'Suez' Ahead In Rubber Markets?" CP, March, 1958, page 75.

Finding the best way to process new chemicals isn't always easy. However, the selection of a double-cone dryer has proven to be a wise choice at Metal & Thermit's Carrollton, Kentucky, plant. Capable of handling big two or three ton batches, unit assures output of top quality products and . . .

## Dries organometallics . . . effectively and economically

**TED F. MEINHOLD**, Associate Editor  
with **ARTHUR A. MANDELL**, Plant Manager  
Metal & Thermit Corporation, Carrollton, Kentucky

**Problem:** An efficient and economical method of drying dibutyltin maleate and dibutyltin oxide was needed for Metal & Thermit Corporation's new organometallics plant at Carrollton, Kentucky. Large scale production experience was limited since the products were relatively new — having mainly been produced only in semi-works quantities.

Batches were to consist of two or three tons. High purity standards were also to be maintained, so extreme precautions had to be taken to avoid contamination. Corrosion too was a problem to be reckoned with at this stage of the process since the products were in the form of a caustic solution. When dry, both materials are a white powder.

The Carrollton plant uses a modified Grignard reaction to turn out some 19 organometallic compounds. Dibutyltin maleate has been found to be useful as a stabilizer for polyvinyl chloride resins. The oxide serves as a catalyst in various condensation reactions. Product is also used by

Metal & Thermit as an intermediate for making other organotins.

The \$3.5 million Kentucky facility is reported to be the most modern and largest of its kind. Production capacity is rated at 2.5 million lb per yr. Initial startup was in 1958.

**Solution:** After careful consideration, M & T engineers selected a big double-cone dryer for the dehydrating operation. The unit stands over 18 ft high and has about eight ft diam. Construction is of stainless steel. Interior is perfectly smooth, there are no baffle arrangements of any kind.

Heat is applied by means of 15 psi steam in dryer's jacket. High vacuum, four-stage steam jets exhaust the vapor-laden air from interior of unit. Large water-cooled condenser facilitates vapor recovery. Condenser operates at 57°F, holds about 120 gal water.

Dryer is charged by means of large conical chute located directly above it. Slurry, previously centrifuged to reduce moisture from 50 to 25 per-

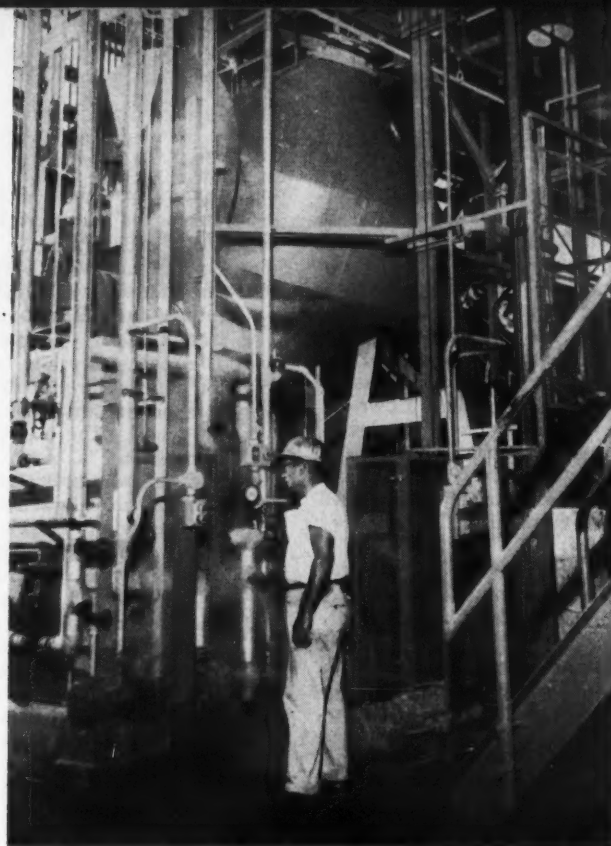
cent, serves as feed.

Drying is conducted at 250°F and 40 mm vacuum. Direct heat transfer dries the material by conduction through the heated walls of the dryer. Also, supplementary heat transfer takes place by conduction and radiation from warmer to cooler parts of batch. Thus, the tumbling batch tends to heat itself uniformly. Further drying is achieved as a result of heat radiating through walls of dryer to the atmosphere within the unit.

The dryer rotates 7-10 rpm. The unit is powered by a 20 hp motor. The continuous rotating action, combined with dryer's conical shape, provides a cascading, tumbling, intermeshing action which completely dries the charge.

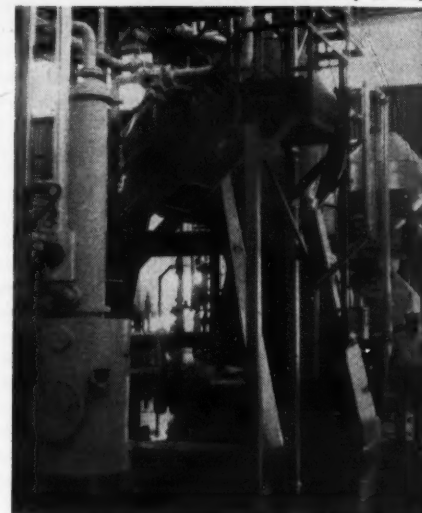
**Results:** The double-cone dryer has proved to be an extremely efficient and economical means for batch-drying the dibutyltin compounds. Moisture content is reduced from 25 to less than one percent. Total time for a two or three ton batch is

*To bottom of page 34*



Big double-cone dryer handles two or three ton batches

*Photos by CP Staff*



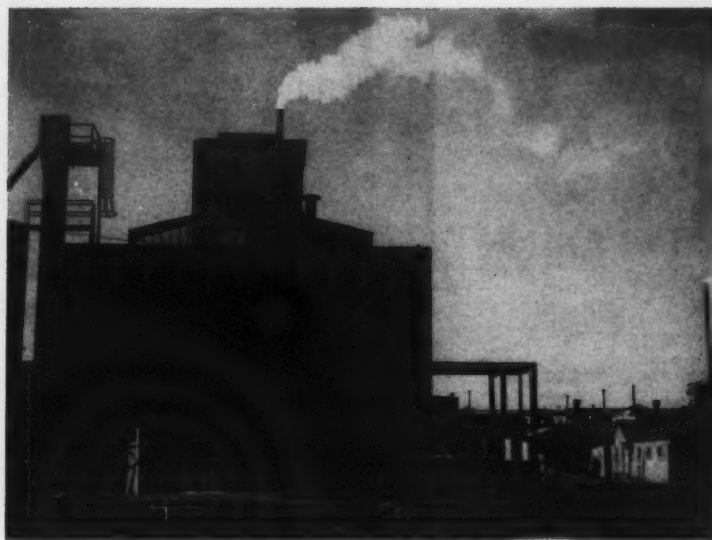
Water-cooled condenser (left) is used to recover vapors exhausted from dryer. Dryer is located behind stairs



This \$3½ million installation can turn out 2½ million lb of organometallic chemicals per yr



Before scrubber was installed — visible cloud is composed largely of water vapor with about 0.5% sulfur trioxide



After scrubber was installed — water vapor has diminished considerably, sulfur trioxide content is practically nothing

## Scrubber absorbs $\text{SO}_3$ fumes, improves community relations

**Ansul Chemical uses unit in sodium bisulfate plant**

**Problem:** Waste gases from the production of anhydrous sodium bisulfate at Ansul Chemical Company, Marinette, Wisconsin, were released directly into the air when the plant was first built in 1955. Sodium bisulfate is the active ingredient in bowl cleaners.

Raw material used in the sodium bisulfate plant is a byproduct from another process. It is an aqueous solution which must be evaporated in order to obtain pelletized sodium bisulfate.

In humid weather, the water vapor vented from the stack by the evaporation produced a fog in the neighborhood of the plant which people noticed and about which they complained. Sulfur trioxide was also present in the

fog in amounts up to 0.5%. The vapor was corrosive and at least potentially harmful to vegetation because of its weak sulfuric acid nature.

Various types of scrubbers were tried and were successful in decreasing the water vapor, but were not effective in absorbing the sulfur trioxide.

**Solution:** In 1957 plant installed a Venturi gas scrubber of the Pease-Anthony type. Waste gases at 200°F enter the Venturi and discharge to a packed tower as shown in one of the photos. Water is introduced into the throat of the Venturi where it is atomized by the high-velocity gas stream. Collected acid mist in the form of weak acid solution is removed from the bottom of the tower.

Scrubbed gases pass out top of unit.

In addition to absorbing  $\text{SO}_3$ , the water sprayed into the tower condenses out a large percentage of the water vapor in the stack gases to avoid formation of a persistent fog.

**Results:** Scrubber has accounted for a definite gain in community relations since the visible fumes have been drastically reduced. Newspaper articles about installation of the scrubber at the plant have contributed to these improved public relations. Analyses show that over 90% of the  $\text{SO}_3$  is absorbed in the scrubber.

During more than two years that the scrubber has been in service, it has required little maintenance. One



Bottom portion of vertical scrubber showing Venturi at right.  $\text{SO}_3$  mist passes through visible portion of Venturi into the vertical tower

reason for this is that no critical controls are required. Also, both the venturi scrubber and the tower are constructed with Havg to withstand the sulfuric acid.

(Venturi scrubber is product of Chemical Construction Corporation, 525 West 43rd Street, New York City 36, New York.)

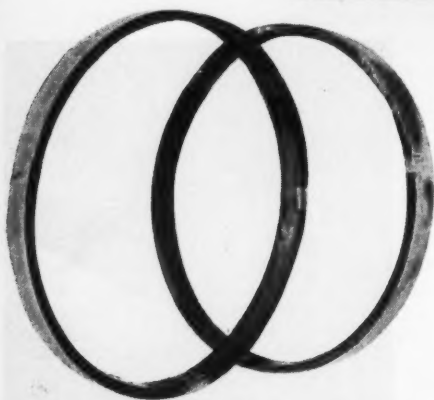
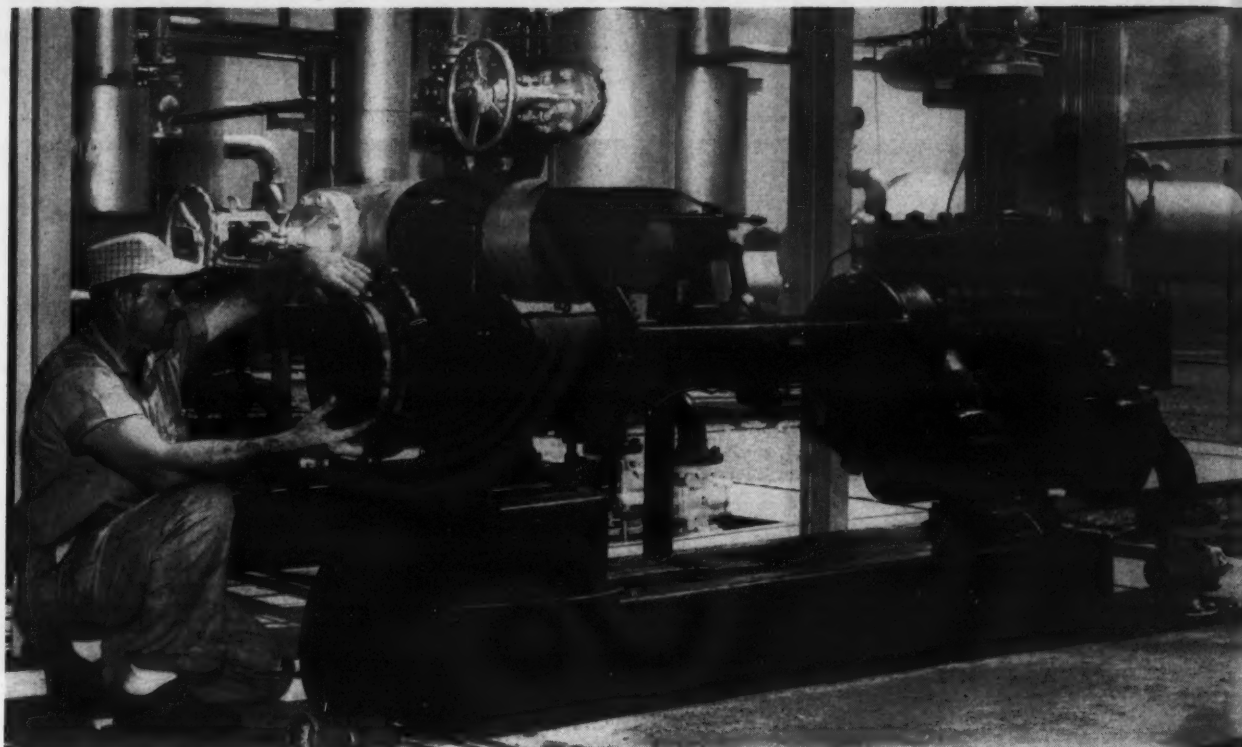
Check 3308 opposite last page.



**NEW SOLUTIONS**  
of processing problems

Filled-Teflon rings being reinstalled on piston after periodic inspection

Filled-Teflon rings are still in good condition after 18-19 months service



## Filled-Teflon Rings Eliminate Need for Lubricating Steam Pump

Cut costs, reduce shutdowns and make plant operations better

**GORDON WEYERMULLER**, Petrochemical Editor  
with **W. L. COFFEY**, Plant Superintendent  
Bay Petroleum Co., Aqua Dulce, Texas

**Problem:** Steam pump used for de-ethanizer feed at Bay Petroleum required about ½ gal of steam cylinder oil, priced at 73¢ a gal, every 24 hours. A filter costing about \$5000 was used to remove oil from steam condensate return. Filter, however, was not 100% effective. Oil in boiler could cause trouble by covering safety plugs. This could cause boiler failure and presented a potentially dangerous situa-

tion to the plant.

Steam pump has following characteristics:

Bore	12"
Stroke	18"
Piston speed	900 ft/min
Pressure	315 psi
Temperature	380°F

**Solution:** In place of the two segmental-type cast iron rings, plant installed Fluorogreen® glass-fiber reinforced Teflon rings in the steam pump in May 1958. These filled-Teflon rings were inspected regularly for first year of service.

**Results:** Filled-Teflon rings

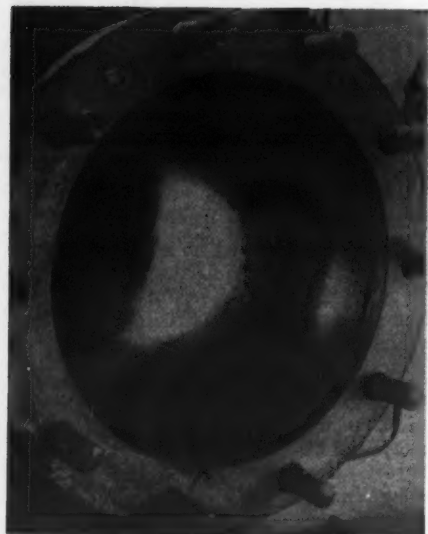
eliminated the need for lubrication. This resulted in savings in oil and improved boiler operations. Filter is no longer needed.

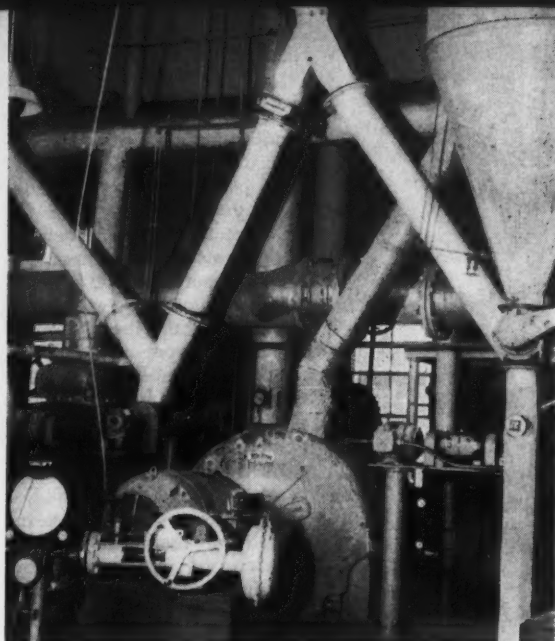
Neither the filled-Teflon rings nor the cylinder wall has worn appreciably. Cylinder wall has been polished to a mirror finish by the filled-Teflon.

(Fluorogreen L piston rings are product of John L. Doré Co., 5406 Schuler St., Houston 7, Texas.)

Check 3309 opposite last page.

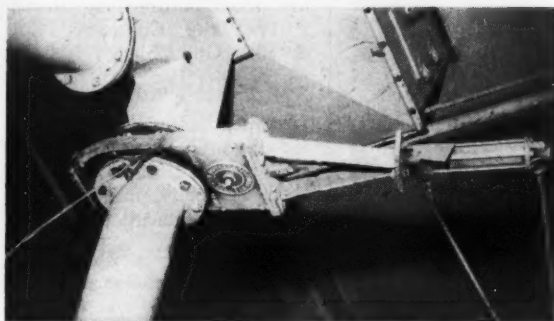
Rings polished cylinder wall to a mirror-like finish





Photos by CP Staff

High-capacity hammer mill (center) is set up to process either corn or rye, can handle approximately 300 lb per minute



Air-operated slide valve is mounted directly in chute, permits changeovers to be made in matter of seconds

**TED F. MEINHOLD**, Associate Editor  
with **ARMAND BOUCHER**, Plant Manager  
Joseph E. Seagram & Sons, Inc., Louisville, Ky.

**Problem:** Close operator attention, coupled with excessive maintenance and repair requirements, made grain grinding on conventional roller mills a tedious and expensive proposition at Joseph E. Seagram & Sons, Inc., Louisville, Kentucky.

Constant adjustments were necessary to assure optimum fineness of grind. Large volumes plus abrasive conditions meant frequent roll changings, causing considerable downtime and production loss. Numerous mechanical parts on

mills had to be checked regularly to prevent additional shutdowns.

The plant had a total of four mills processing either corn, rye, or malt. The units operated continuously, around-the-clock, and reduced the grain to a fine meal. Milling breaks the outer protective wall around the grain kernel preparing it for subsequent mashing operations.

Processed grain is moved directly from the mills to the cooking system of the distillery where mashing process

# SLASH MILL MAINTENANCE OVER 90%

**Heavy duty hammer mills speed, simplify  
grain processing at distillery**

begins. Rigid quality control and testing procedures are used by the company to insure output of top quality products.

**Solution:** The roller mills were replaced by high capacity hammer mills. Designed for continuous operation, the heavy-duty units produce granular grinds essentially free of floury fines. Size reduction is accomplished in two phases. Before entering hammer section, grain kernels are exposed to hard-surfaced roll crushers. Mounted on pivots, these units reduce the grain by impacting the kernels between roller surfaces and the mill case.

Material is distributed in such a way that grain particles enter hammer section evenly along entire circumference of the section. This peripheral distribution is a key factor in achieving above-average uniform sizing of final product.

Final reduction takes place in the hammer section, which is somewhat larger than the roll crusher section. Hammers are designed to produce granular grinds of predetermined particle size. Only product meeting desired specification passes through screen surrounding grinding chamber. Mills are gravity discharged and do not require fan con-

veying systems for moving product to storage bins or other processing areas.

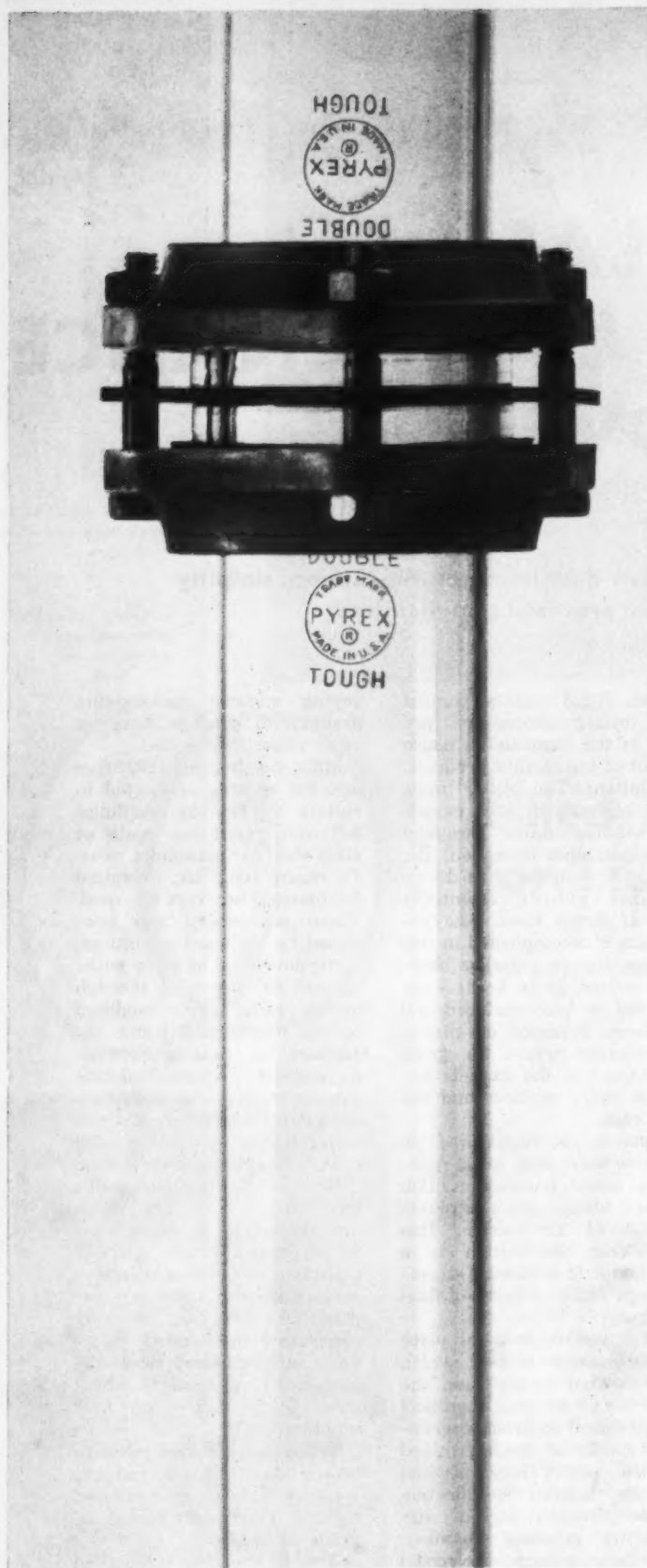
Mills operate at 1800 rpm and are directly connected to motors by flexible couplings. All mill parts are made of alloy steel for maximum wear. To insure long life, oversized double-row bearings are used. These are sealed and protected by outboard mountings.

Air developed by rotor within mill is evacuated through an air relief valve mounted on top of the mill frame in addition to passing through a primary cyclone collector the air stream also goes to a secondary dust filter arrangement. Consequently, milling area is completely free of dust.

**Results:** The hammer mills have streamlined production and slashed maintenance over 90 percent. Constant operator attention is no longer necessary, since the units are capable of running continuously completely unattended. Hammers are checked and replaced, if necessary, about once every three or four months.

Better quality and constant uniformity of grinds has cut waste and actually increased alcohol yield per bushel of grain processed.

Two of the four mills used at the plant are capable of



## How to run a simple test study on PYREX® pipe and corrosion

A few hours and a few dollars may be enough to end corrosion in your piping altogether.

Choose a process line where you have the worst corrosion. Put in a length or a section of PYREX pipe. Sit back and let the pipe go to work.

We are positive you'll learn two things from this study.

You'll find the PYREX pipe can indeed end your corrosion problems unless you're handling large quantities of hydrofluoric or glacial phosphoric acid, or hot alkalis. Any other chemical or combination of chemicals should slip through without a trace of corrosion.

You'll find that PYREX pipe installs so much more easily and so much faster than most other materials that it is actually one of the least expensive piping materials you can use.

Your local PYREX pipe distributor can show you how to attach this pipe to your present lines—fittings are available for making attachment to any type of process pipe. See our insert in Chemical Engineering Catalog. Or, if you prefer, you can write direct to us for a copy of PE-3, the PYREX Pipe Bulletin. Address: Plant Equipment Sales, 3 Crystal Street, Corning, N. Y.



**CORNING GLASS WORKS**  
CORNING MEANS RESEARCH IN GLASS

## NEW SOLUTIONS

handling about five bushels (approximately 300 lb) whole grain corn or rye per minute. The other two are used for grinding malt at a somewhat lower rate. There are two scale hoppers serving each of the corn-rye mills—one scale for corn, the other for rye. Switching from one to the other is accomplished in matter of seconds by actuating a six-inch, air-operated, slide valve.

Used about 15 times per day, this steel valve has simplified changeovers greatly. It replaced a manually-operated wooden valve formerly used for this purpose. The new valve has already seen three years of tough, relatively abrasive service and shows no sign of wear.

(Blue Streak hammer mills are manufactured by Prater Pulverizer Company, 1515 S. 55th Ct., Chicago 50, Ill.)  
Check 3311 opposite last page.

(Further information about air-operated slide valves may be obtained from W. S. Rockwell Company, 220 Eliot St., Fairfield, Connecticut.)

Check 3312 opposite last page.

## Vacuum Dryer

From page 30

about 16 hours. Finished product is quickly dumped into mobile, conical-shaped bins for transfer to packaging or other operations.

In addition to being easy to load, operate, and discharge, the unit has a number of safety features built into it. Among these is an automatic pressure venting system that guards dryer against excessive pressure buildups.

(Rota-Cone vacuum dryer was manufactured by Paul O. Abbe' Inc., 239 Center Avenue, Little Falls, New Jersey.)

Check 3313 opposite last page.

(Further information about organometallic chemicals may be obtained from Metal & Thermit Corp., Rahway, N.J.)

Check 3314 opposite last page.

Check 3310 opposite last page.



**Radioactive liquid wastes  
will be concentrated  
by Inconel evaporator**

The atomic age is giving birth to some new evaporator designs. Case in point is unit being constructed for Consolidated Edison Co., of New York, Inc. The evaporator will concentrate radioactive wastes from the company's 275,000 kw Indian Point nuclear power plant. Installation is scheduled to go into service April 1961.

The evaporator will be a welded, flangeless unit, constructed entirely of Inconel nickel alloy. Unit's entrainment separator, a mesh demister, will consist of woven stainless steel. The demister will be three feet thick — or about six times thicker than those normally used in refinery service.

Evaporator will process wash-down and purge water from the entire plant. It will vaporize waste so effectively that less than five parts in 100 million of dissolved solids will remain in the discharge. An ion-exchange unit will reduce this to less than one part in 100 million.

The concentrate of radioactive wastes — up to 30 percent dissolved solids — will be disposed of according to procedures of the AEC and New York State.

The evaporator is engineered for a 6000 lb per hr boil-off. Unit measures 19 ft high and has 6½ ft diam. Its hairpin steam heating loops may be cleaned by thermal shock. The evaporator will operate on 250 psi steam max. Internal pressure will be below 50 psi.

(Evaporator is being constructed by Chicago Bridge and Iron Company, 332 South Michigan Ave., Chicago 11, Illinois.)

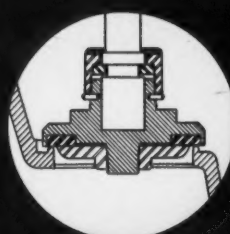
Check 3315 opposite last page.

**New Solutions section  
continues on page 56.**

# PERMANENTLY LEAKPROOF



exclusive  
TEFLON V-RING  
PRESSURE SEAL



TEFLON  
SEAT DISC



RegO TA series globe and angle valves

## NO PACKING TO ADJUST

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An outstanding value—wear and maintenance problems drastically reduced. Rugged Ductile Iron Body won't crack or fracture from wrenching or dropping. Centerless ground stainless steel stem, won't gall, pit or freeze. Spring-loaded for tight seal at low pressures; V-shaped seal expands under added pressure.

Easy-to-operate at all times. RegO exclusive Teflon V-Ring seal is the most effective stem seal yet developed. Eliminates hard-to-turn valve handles. No packing to cause binding of stems. Outstanding valve value in every sense of the word!

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Check 3316 opposite last page.

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and assured availability\*



\*Thanks to increased plant capacity

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can help you make better polyesters, polyurethanes, surfactants, humectants, plasticizers, coupling agents

1,3-Butylene Glycol is a low-cost, 4-carbon glycol with unusual stability. Its combination of two non-adjacent hydroxyl groups prevents dehydration or ring closure. It is highly hygroscopic, non-toxic and soluble in water and most organic solvents.

1,3-Butylene Glycol's longer chain length and steric configuration open new possibilities for producers of textile lubricants, printing inks, dyes, cosmetics, toilet goods, elastomers, plasticizers and alkyd, polyurethane and polyester resins.

It is of particular interest in the preparation of phthalic, maleic and fumaric alkyd resins and polyesters for plasticizers, coating materials, laminates, and potting compounds.

1,3-Butylene Glycol is available from Celanese in tank cars, compartmented cars and drums. Find out how this versatile glycol can improve your product ... save you money in production costs. Write us for further information.

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Celanese Chemical Company, a Division of Celanese Corporation of America,  
Dept. 591-B, 180 Madison Avenue, New York 16, N. Y.

Canadian Affiliate: Canadian Chemical Company Limited, Montreal, Toronto, Vancouver.  
Export Sales: Amcel Co., Inc., and Pan Amcel Co., Inc., 180 Madison Ave., N. Y. 16.

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**POLYESTERS**—Polyesters prepared with 1,3-Butylene Glycol are non-crystalline in structure due to the glycol's steric structure.

**POLYURETHANES**—Saturated polyesters can be prepared from 1,3-Butylene Glycol with various polyfunctional acids and alcohols.

**SURFACE ACTIVE AGENTS**—Esterified with fatty acids or etherified with alkylated phenol, 1,3-Butylene Glycol produces non-ionic detergents with good emulsion breaking properties and improved compatibility with non-polar compounds.

**POLYMERIC PLASTICIZERS**—Plasticizers with improved dielectric properties are obtained from 1,3-Butylene Glycol.

**HUMECTANTS**—Low volatility, low toxicity and good hygroscopicity properties make this glycol desirable as a humectant for tobacco, cosmetics and paper.

**COUPLING AGENTS**—Mutual solubility with water and various organic materials make 1,3-Butylene Glycol a useful blending and coupling agent for various pastes, dyes, textile lubricants, greases and toilet goods.

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Exhibiting ability to contribute useful characteristics to many polymers, and serving as reactive intermediates for dyes, germicides, and pharmaceuticals . . .

## Chlorinated xylenes show promising future

**DR. GEORGE F. RUGAR**

Manager, Product Development Department  
Diamond Alkali Company, Painesville, Ohio

**H**IGH polymers, particularly polyesters, polyurethanes, and polyanhydrides, are a promising area of use for at least two of a group of compounds making their presence known in the chemical marketplace. Terephthaloyl and isophthaloyl chlorides, members of the chlorinated-xylene-derivative family that show most potential, are joined by a number of other relatives (see table). In

general, side-chain-chlorinated products can be converted into diols to serve as cross-linking agents for solid polyurethane elastomers and for vulcanizing rubbers. They are highly reactive intermediates for pharmaceuticals, dyes, germicides, fungicides and herbicides.

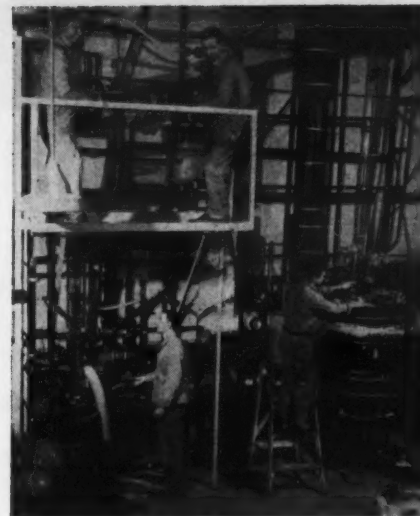
Heavily ring-chlorinated derivatives have ability to add flame-retardant properties to end products. They also can

be used as solvents and intermediates for production of dyes and pigments.

Polymers made from terephthaloyl and isophthaloyl chloride appear useful as high temperature lubricants; in making synthetic fibers; as plasticizers, adhesives, elastomers; and surface coatings, particularly for wire enamels.

Promise of commercial availability of xylene of acceptable quality moved work

on chlorinated derivatives of this compound up to status of a major research project at Diamond Alkali Company in 1956. With a strong background in chlorination of organic materials, Diamond pushed ahead to prepare a variety of derivatives. By 1957, project had grown to pilot-plant proportions and eight of xylene derivatives selected as most promising for further development. *To next page*



Pilot plant chlorination installation at  
Diamond Alkali

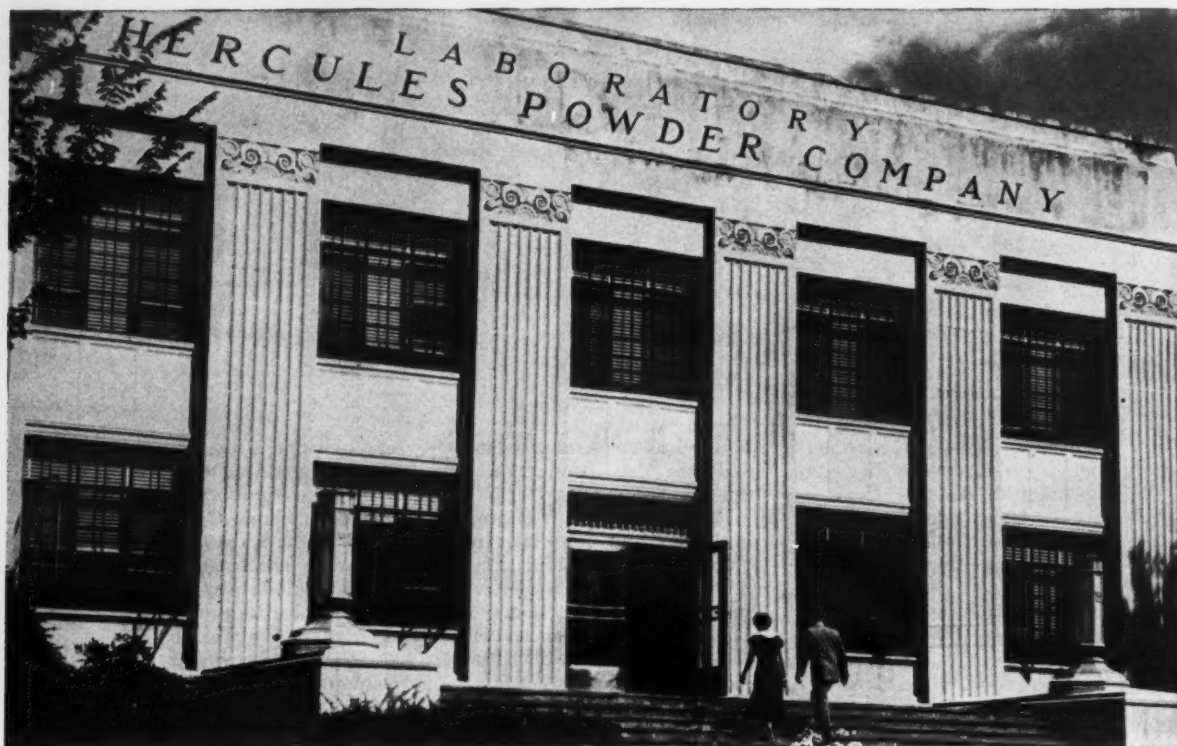
### CHLORINATED XYLENE DERIVATIVES

Compound	Toxicity	Odor	MP °C	BP °C	Uses
Terephthaloyl chloride $C_6H_4Cl_2O_2$	LD <sub>50</sub> * more than 3160 mg/kg	Sharp, pungent	81	266	High polymers; plasticizers; cross-linkers for urethanes, rubbers; intermediate for dyes, germicides
Isophthaloyl chloride $C_6H_4Cl_2O_2$	LD <sub>50</sub> more than 3160 mg/kg	Sharp, pungent	43	276	High polymers; textiles; surface coatings; plasticizers; lubricants; germicide, dye intermediate
$\alpha$ -Chloro-p-xylene $C_6H_5Cl$	Skin irritant, lachrymator	Pungent	4.5	200	Intermediate for pharmaceuticals, dyes, fungicides, herbicides
$\alpha, \alpha'$ -Dichloro-p-xylene $C_6H_4Cl_2$	LD <sub>50</sub> 1780 mg/kg	Sweet	100	254	Polyamides, other high polymers and resins; dye intermediate
$\alpha, \alpha'$ -Hexachloro-p-xylene $C_6H_2Cl_6$	LD <sub>50</sub> more than 3160 mg/kg	None	110	—	High polymers; elastomer quaternizing agent; fluorine compounds
2-Chloro-p-xylene $C_6H_5Cl$	No handling toxicity observed during manufacture	Like p-xylene	—	186	Dye, pigment intermediate; polyesters; solvent
2,5-Dichloro-p-xylene $C_6H_4Cl_2$	No handling toxicity observed during manufacture	Similar to p-dichlorobenzene	2.0	222	Polyesters; dye, pigment intermediate; solvent; adds flame retardancy
2,3,5,6-Tetrachloro-p-xylene $C_6H_2Cl_4$	No handling toxicity observed during manufacture	None	71	—	High polymers with flame-retardant properties; intermediate for dyes, pigments; solvent
			223		

\*Acute oral toxicity for male albino rats based on body weight



# HOW **HERCULES** HELPS YOU BUILD A CAREER...



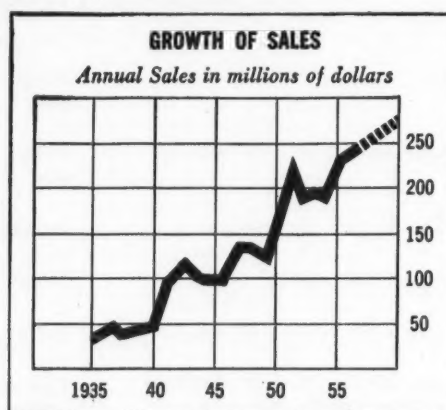
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main research center is equipped to solve the technological problems of customers as well as to pioneer in the development of new uses for the company's varied materials for industry.

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**CHEMICAL MATERIALS FOR INDUSTRY**



Check 3318 opposite last page.

## CHEMICAL MATERIALS

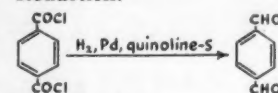
### Chlorinated Xylenes

From preceding page

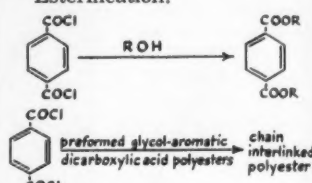
#### Typical Reactions

Terephthaloyl chloride is a white crystalline solid soluble in benzene to 35% by weight at 25°C.

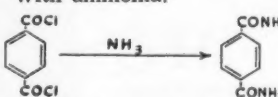
Reduction:



Esterification:



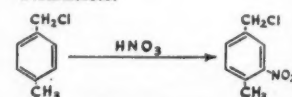
With ammonia:



Isophthaloyl chloride is a white crystalline solid soluble in benzene to 73% by weight at 25°C. Reactions in general are similar to terephthaloyl chloride.

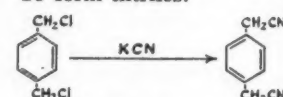
$\alpha$ -Chloro-p-xylene is a colorless liquid insoluble in water and ethylene glycol. It is completely miscible with acetone, ethyl acetate, methanol and diethyl ether.

Nitration:

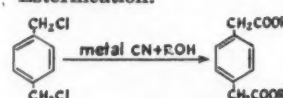


$\alpha, \alpha'$ -Dichloro-p-xylene is a white crystalline solid insoluble in ethylene glycol and water. Solubility in acetone, benzene, cyclohexanone, p-dioxane and ethyl acetate ranges around 20% by weight at 25°C.

To form nitriles:



Esterification:



$\alpha, \alpha'$ -Hexachloro-p-xylene is a white crystalline solid with solubilities resembling  $\alpha, \alpha'$ -dichloro-p-xylene.

To page 40

# Which of these 3 products and services can you use from BECCO?



## TECHNICAL BULLETINS DESCRIBING $H_2O_2$

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- No. 41—Becco  $H_2O_2$  35% HP (high purity)
- No. 42—Becco  $H_2O_2$  35% Formula D (for preparing dilute solutions)
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## Where can you use these other Becco PEROXIDES?

By "other", we mean "Other than Hydrogen Peroxide". Lots of otherwise knowing people labor under the impression that Becco makes only  $H_2O_2$ . Actually, there are quite a few "other" useful peroxides in Becco's catalog, some of which are especially suited to high-temperature oxidation reactions.

Look over the list below. Give you ideas? Remind you of a problem you've got? Either way, a note to Becco will bring you more information. Or, use the handy coupon.

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**CALCIUM PEROXIDE**—for dough conditioning and in high-temperature oxidation reactions.

**MAGNESIUM PEROXIDE**—an anti-fermentative, for compounding antacids and laxatives.

**ZINC PEROXIDE**—for use as a disinfectant and deodorant in dusting powders, ointments, etc.



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Dept. CP-M

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**New plant now producing highly adsorptive free-flowing powder**

Aicco-SOL is a synthetic form of magnesium silicate with remarkable adsorptive powers, capable of de-odorizing and de-coloring liquids, and preventing caking of powders. It is a fine, white, free-flowing powder with porous structure and high surface-to-volume ratio.

Aicco-SOL is selective in its adsorptive powers, with strong affinity for acidic and polar materials, moisture vapor, gases, and color and odor-forming compounds.

Made in Aicco's new plant . . . an outgrowth of American Industrial Chemical Company's experience as a producer of silica gel, hydro gel, and other silicates. Samples and technical assistance gladly offered.

- USES**
- Removal of colors, odors, and impurities from solvents, oils, fats, waxes, and synthetic organic chemicals
  - Curing plastics: prevention of blisters by absorbing vapor and gases released during molding
  - Controlling thixotropy of plastic coatings

- Chromatographic adsorption in antibiotic and vitamin manufacture
- Retaining moisture, perfumes and flavors in powdered products.
- Preventing caking in plastic molding compounds, fertilizers, detergents, tooth powder, feed supplements, etc.
- Catalyst and catalyst carrier

### PROPERTIES OF AICCO-SOL

Density, gm./cc. 2.04  
Specific Area 600 sq.m./g.  
Refractive Index 1.500-1.515  
Pores: Volume 630 ml./g.  
Avg. Dia. 33 Å  
Distribution Uniform  
pH of 10% slurry 7.5-8.5

Reactions: Water adsorbed; no change in volume.  
Weak acids removed by adsorption.  
Strong acids dissolve it.  
In salts, heavy metal ions displaced.  
In bases, no reaction.



Write for data and samples

**AMERICAN INDUSTRIAL CHEMICAL COMPANY**  
Div. of Amerace Corporation • Butler, N. J.

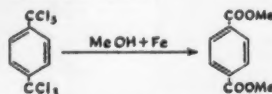
Check 3320 opposite last page.

## CHEMICAL MATERIALS

### Chlorinated Xylenes

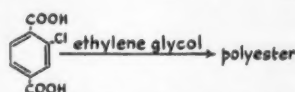
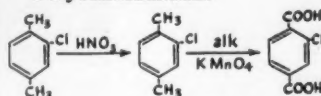
From page 38

#### Esterification:



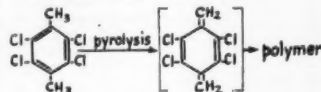
2-Chloro-p-xylene, a colorless liquid, and 2,5-dichloro-p-xylene, a white crystalline solid, have similar reaction characteristics.

#### Polycondensation:



2,3,5,6-Tetrachloro-p-xylene is a white crystalline solid sparingly soluble in benzene and carbon tetrachloride. It is insoluble in water, acetone, ethyl acetate and diethyl ether.

#### Polymerization:

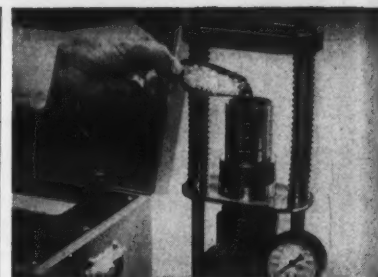


Pilot plant quantities of all compounds are available. Economics of production indicate that probable price ranges will permit large scale utilization. (Chlorinated xylene derivatives are products of Diamond Alkali Company, Union Commerce Building, Cleveland 14, Ohio.)

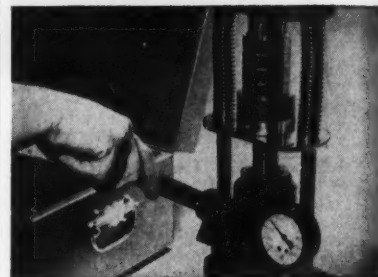
Check 3321 opposite last page.



"Grocery list! . . . I just created a new formula from it!"



**FEED IT...**



**SQUEEZE IT...**



**READ IT...**

### G-5 Moisture Register for accurate moisture tests in 60 seconds

Fastest moisture test available with accuracy to 0%. Save production and lab time—no skilled labor needed. Use Electronic Moisture Register G-5 anywhere on granular, ground, loose, shredded and powdered materials. Hydraulic pressure assures homogeneous sample. Specially calibrated for ammonium nitrate, ammonium sulphate, toilet soaps, calcium carbonate, sulphur, ammonium perchlorate, sodium bicarbonate, polyethylene resins, many more. Accuracy guaranteed. Ask for free trial.

Write, stating material to be tested, and moisture range, or check No. 3322 on reader service slip.

**ELECTRONIC MOISTURE REGISTER**  
Instruments

Moisture Register Co., Dept. GPC  
P. O. Box 910, Alhambra, Calif.

Check 3322 opposite last page.

CHEMICAL PROCESSING



**No fire hazard found  
in solvent-free  
paint driers**

For use in water-thinned,  
paint films

**Uses:** Driers are especially formulated for use in water-thinned paints.

**Features:** Consisting of extremely fine dispersions of naphthenates in special aqueous media, products present no fire hazard during handling or storage. They provide increased hardness, improved resistance to water spotting, and are easily incorporated in any stage of manufacture.

**Description:** Driers are pourable liquids that are miscible and compatible with each other. They are compatible with all latex and pigment dispersion systems. Particle size is in same order as latexes, about one micron. Three products are available: Cobalt 5%; lead 20% and manganese 5%. All products are non-ionic and have a pH range of 6.0-8.0.

(Meletex driers are product of Harshaw Chemical Co., 1945 E. 47th St., Cleveland 6, Ohio.)

Check 3323 opposite last page.

**Antioxidant for greases  
is ashless, stable**

**Uses:** As a stabilizer in synthetic lubricants, greases, and mineral and synthetic oils.

**Features:** Antioxidant is ashless and effective at low concentrations.

**Description:** Product is based on a mixture of aryl amines. When used as a stabilizer in synthetic lubricants, it effectively inhibits viscosity change, copper corrosion, and acid number increase in high temperature oxidation tests.

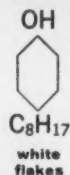
(Ortholeum 302 antioxidant is the product of Petroleum Chemicals Div., E. I. du Pont de Nemours & Company, Wilmington, Delaware.)

Check 3324 opposite last page.

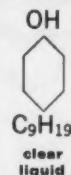
How much  
do you know  
about

# ALKYLPHENOLS?

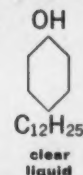
## OCTYLPHENOL



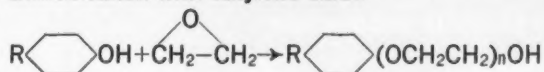
## NONYLPHENOL



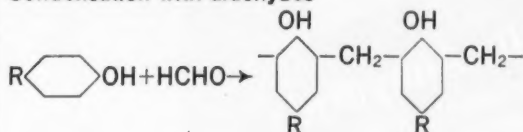
## DODECYLPHENOL



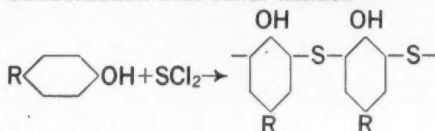
### Etherification with ethylene oxide



### Condensation with aldehydes

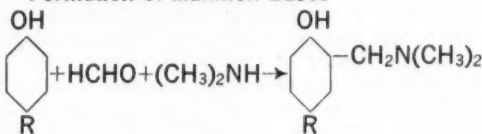


### Condensation with sulfur halides

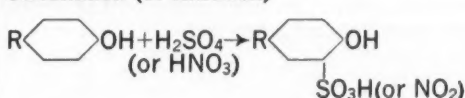


### Reaction with aldehydes and amines —

#### Formation of Mannich Bases



### Sulfonation (or Nitration)



Did you know, for instance, that the three alkylphenols supplied by Rohm & Haas—octylphenol, nonylphenol, and dodecylphenol—are low-cost, reactive intermediates that can undergo etherification; condensation with aldehydes and sulfur halides; esterification (with organic and inorganic acids); nitration, sulfonation, and halogenation of the benzene ring; and many other reactions. Several of these reactions are given at the left.

Etherification with ethylene oxide gives a family of surface-active agents useful in a wide variety of applications. Calcium and barium salts of a number of alkylphenol derivatives provide lubricating- and fuel-oil additives. Condensing formaldehyde with phenol and a small quantity of an alkylphenol gives phenolic resins with improved oil solubility, water resistance, and electrical resistivity; these properties make such resins admirably suited for applications such as oil-soluble varnishes for electrical insulation. Octylphenol stabilizes ethyl cellulose against ultraviolet light degradation. Alkylphenols also offer possibilities as intermediates in making fungicides, bactericides, dyestuffs, pharmaceuticals, adhesives, and rubber chemicals.

### LITERATURE AND SAMPLES

Write to Dept. SP-12 for samples and a 16-page booklet with more information on alkylphenol reactions.



Chemicals for Industry

**ROHM & HAAS  
COMPANY**

WASHINGTON SQUARE, PHILADELPHIA 5, PA.

Check 3325 opposite last page.



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## the GROWTH chemical resource (for GROWTH industries)

**Maleic Anhydride**  
plant under construction

**Isophthalic**  
first commercial production

**Terephthalic Acid**  
large scale production

**Phthalic Anhydride**  
first production from  
petroleum

Since pioneering production of phthalic anhydride from petroleum, Oronite has allocated a great portion of its resources to researching, developing, producing and marketing advanced raw material products to the plastics and surface coating industries. The popularity of Oronite products plus affiliation with one of the world's largest producing and refining oil companies is your assurance that Oronite will continue its extra effort to serve growth industries. Why not talk over your chemical requirements with Oronite—one of the world's leading petrochemical resources.



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A CALIFORNIA CHEMICAL COMPANY SUBSIDIARY

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Los Angeles, San Francisco, Seattle

Foreign Affiliate: California Chemical International, Inc., San Francisco, Geneva, Panama

Check 3326 opposite last page.

## CHEMICAL MATERIALS

### Odor control products offered for phenolics and ammonia

Two odor control products have been recently introduced.

First is a water-dispersible product proven effective in abating objectionable odor of ammonia (Alamask-AMA-C). Suggested application concentration is 1 oz per gallon in aqueous ammonia (26° Bé).

Second is recommended for reodorization of cresylic and phenolic compounds (Alamask RLT-454-M). It is readily soluble in most organic compounds and also is available in water-soluble form. Concentration, added in final stages of processing, is 0.1-0.3% by weight.

(Alamask-AMA-C and RLT-454-M are products of Rhodia, Inc., 60 East 56th St., New York, N.Y.)

Check 3327 opposite last page.

### Resin cuts coating cost and maintains quality of finishes

High bulking values give more volume per pound

**Uses:** Resins should find application in appliance and industrial finishes, automotive primers, drum enamels and pipe and tank coatings. Modifications show promise as laminating resins.

**Features:** Resins permit formulator to obtain products with properties comparable to conventional high-quality resins, at lower cost. Bulking values compared to conventional vehicles offer lower cost based on greater volume per pound.

Polymers compare favorably with alkyd at epoxy resins in abrasion resistance. Test data indicate that chemical resistance is comparable to conventional high quality resins.

**Description:** Basic resin is a styrene-butadiene copolymer of low molecular weight (8000-10,000) and high unsaturation (iodine number approximately 300). Since

## CHEMICAL MATERIALS

compatibility of this basic resin (Buton 100) is limited, modifications have been prepared for specific end uses. Two are currently available, Buton 200 and 300. They have been treated to introduce polar groups yielding products having compatibility with other coating materials. A wide range of particular properties can be obtained by blending these modifications together and with other coating materials.

All three forms may be baked or flame cured. In addition, 200 and 300 may be cured by cross linking with tetrachlorophthalic anhydride or organic phosphates such as ethyl acid phosphate at low (200-250°F) temperatures. Modification with nitro cellulose yields films curable at room temperature.

These polymers can be flame cured. This technique consists of impinging an air-gas flame directly on surface of wet resin coating. Although films subjected to flame curing have a tendency to darken, chemical resistance is outstanding. Flame-cured films are superior to baked film in many resistance properties.

(Buton resins are a product of Enjay Company, Inc., 15 West 51st Street, New York 19, N.Y.)

Check 3328 opposite last page.

### **Porous phosphate form combines best powder, granular properties**

Porous form of granular mono sodium phosphate combines desirable qualities of both crystalline granular and powdered products. Material will hold up to 10% liquid nonionic without becoming wet in appearance. It has non-ionic holding power of a powder, yet retains excellent flow properties inherent in a granular material.

(Mono sodium phosphate is a product of Inorganic Chemicals Div., Monsanto Chemical Company, 800 North Lindberg Blvd., St. Louis 66, Missouri.)

Check 3329 opposite last page.

Heat Color, APHA Pt-Co Std. 85 max.  
(2 hours at 200°C.)

## *quoted from the specifications for* **NATIONAL<sup>®</sup> ADIPIC ACID!**

That's right! When we say "highest purity . . . lightest color" we're proud to be explicit.

Specifications for National Adipic Acid assure you of practically water-white material in solution and only slight discoloration after heating for two hours at 200°C. That's a tough specification to maintain . . . yet every shipment meets or exceeds our high standards for color as well as our minimum purity of 99.8%.

If you use adipic acid in plasticizers, resins, alkyds and other esters, you ought to have a working sample of National Adipic Acid and our current shipping specifications. Our nearest office will gladly supply them.

### **NATIONAL ANILINE DIVISION**

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Atlanta Boston Charlotte Chicago Greensboro Los Angeles

Philadelphia Portland, Ore. Providence San Francisco

In Canada: ALLIED CHEMICAL CANADA, LTD., 100 North Queen St., Toronto 18

Distributors throughout the world. For information:

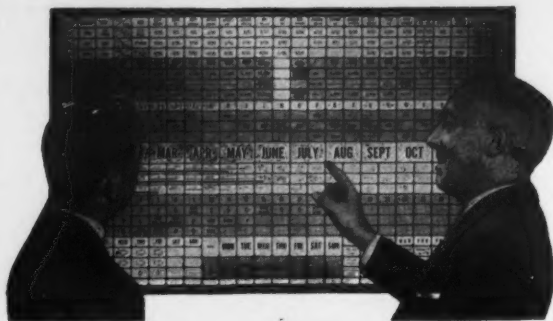
ALLIED CHEMICAL INTERNATIONAL • 40 Rector St., New York 6, N. Y.

**Allied  
Chemical**

Check 3330 opposite last page.



## How To Get Things Done



### BOARDMASTER VISUAL CONTROL

Gives you a Graphic Picture of your operations, spotlighted in color. You See what is happening at a glance. Facts at eye level—saves you time, prevents errors.

Simple, flexible—easily adapted to your needs. Easy to operate. Type or write on interchangeable cards, snap in grooves. Ideal for production, scheduling, sales, traffic, inventory, etc. Made of metal. Compact, attractive.

Complete Price **\$49<sup>50</sup>** Including Cards

**FREE**

24-Page Illustrated Booklet AA-50  
Mailed Without Obligation

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Check 3331 opposite last page.

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VELVETEEN R. SILICA  
OO SILICA SMOKE  
DUSTEX MICRO SILICA

Low in Cost  
Easy Dispersion  
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Ease of Brushing  
Permits High P.V.C.'s  
Good Scrubability  
Aids Flattening  
Promotes Leveling  
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Dry Hardness  
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DEPT. PM 42 278 N. LA SALLE ST. CHICAGO 1, ILL.

Check 3332 opposite last page.

## CHEMICAL MATERIALS

### Acrylic emulsion polymer is water-reducible and thermosetting

**Uses:** Acrylic polymer emulsion vehicle for baking finishes.

**Features:** Vehicle retains desirable characteristics shown by acrylic polymers — excellent color properties, chemical stability and durability. In addition, use of water as a coating diluent eliminates fire hazards, toxic vapors, expensive organic solvents and thinners.

**Description:** Thermosetting acrylic emulsion polymer, Rhoplex AC-200, is supplied in an aqueous medium.

Appearance	Milky liquid
Solids, %	46 ± 1
pH	9.0 to 10.0
Lb./gal	9.1

Comparison tests with a conventional melamine-alkyd enamel indicate that coatings formulated with this acrylic vehicle have equal or superior impact resistance and flexibility.

(Rhoplex AC-200 acrylic vehicle is a product of Resinous Products Div., Rohm & Haas Co., Washington Square, Philadelphia 5, Pa.)

Check 3333 opposite last page.

### Mold release agent for 'one shot' foams

**Uses:** Formula was developed specifically as a release agent for "one-shot" polyurethane foams.

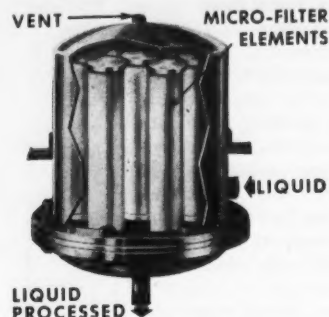
**Features:** Fast-drying formula does not require baking. It can be used successfully on molds made of aluminum, epoxy and wood.

**Description:** Release agent is off-white gel with a neutral pH, composed of a neutral solvent dispersion of waxes and resins. It can be applied with a brush or rag or conventional spraying equipment. Formula contains no silicones, has no odor.

(Formula OSR mold release agent is a product of Clover Chemicals, 617 North Michigan, Howell, Michigan.)

Check 3334 opposite last page.

## SELAS MICRO-FILTRATION



Selas Micro-Filter Multi-Element

Selas micro-porous porcelain filters are used for clarification, polishing, cold sterilization of pharmaceuticals, biologicals, fine chemicals and other continuous operations where physically pure liquids are required. Filters, in single and multi-element units, contain inert, micro-porous porcelain and are designed and built for aseptic or corrosive conditions.

Send for Bulletin 149

**SELAS** Heat and Fluid Processing Engineers  
CORPORATION OF AMERICA  
DREHLEN, PENNSYLVANIA  
DEVELOPMENT - DESIGN - CONSTRUCTION

Check 3335 opposite last page.

## DAWE'S a dependable source for SODIUM GLUCONATE and GLUCONIC ACID

Promptly available in any quantity.

Warehouse stocks across the country.

Dawe's high quality is assured.

Write for technical data and samples.

**DAWE'S  
LABORATORIES, INC.**  
4800 South Richmond Street  
Chicago 32, Illinois

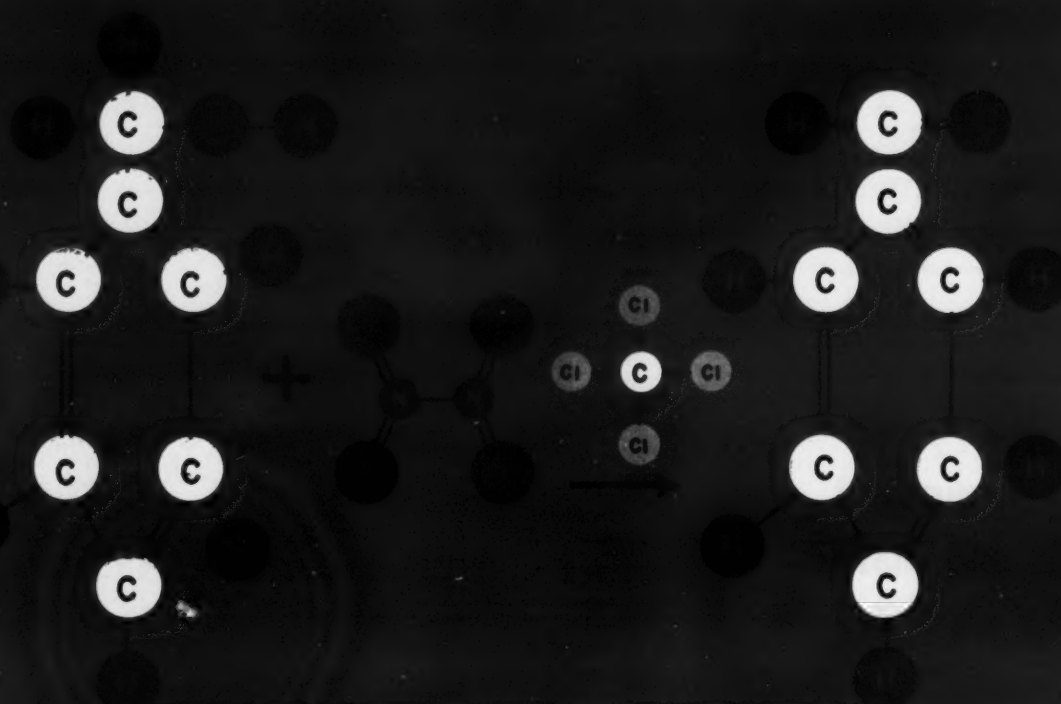
*Dawe's*

Check 3336 opposite last page.

CHEMICAL PROCESSING

## Light-fast green pigment upgrades paints and plastics

## 45



DO REACTIONS LIKE THESE

## HOLD A LOW COST SOLUTION TO YOUR OXIDATION PROBLEMS?

Allied Chemical Nitrogen Tetroxide is a low-cost oxidant. It can be used in the wood pulping, rubber, metal recovery, and lubricant purification industries, and for many other applications. Perhaps this versatile chemical can solve some of *your* oxidation problems.

See the box at right for further reactions. For further information and application data on Allied Chemical Nitrogen Tetroxide, write for Allied Chemical's 59 page product bulletin "Nitrogen Tetroxide".

Allied Chemical's Nitrogen Tetroxide is shipped in tank-cars, one-ton cylinders, or 125 and 150 pound cylinders.

### NITROGEN TETROXIDE CAN BE USED AS A LOW COST OXIDIZER:

- ... At very low temperatures in the form of solutions, such as NO in N<sub>2</sub>O<sub>4</sub>
- ... In concentrated liquid form from -11° to 21°C
- ... In acids such as sulfuric and nitric
- ... As a gas in form of NO<sub>2</sub> at elevated temperatures
- ... As a solution in carbon tetrachloride or chloroform from 0° to 30°C for such oxidation reactions as
  - Aromatic alcohols to aromatic aldehydes;
  - Alkyl aryl carbinols to ketones;
  - Alcohol groups in starch or cellulose to carboxyl groups;
  - Thiols to sulfonic acid.

For specifications and local offices, see our insert in Chemical Materials Catalog, pages 475 - 482 and in Chemical Week Buyers Guide, pages 37 - 44.

### NITROGEN DIVISION

Dept. NT 13-2-3, 40 Rector Street, New York 6, N. Y.

BASIC TO  
AMERICA'S  
PROGRESS

2819

all outstanding characteristics of its class: clear, brilliant color; chemical resistance and heat stability; excellent light-fastness. In order to obtain this color formerly it was necessary to blend phthalocyanine green or phthalocyanine blue with Hansa yellow or benzidine yellow. Exposure to light caused fading, or loss of tinctoral strength in yellow pigment, and color became more blue.

In Heliogen viridine Y there is no fading even after 200-hour exposure in Weather-Ometer. Pigment shows no solvent bleed with alcohol, xylene, MEK, mineral spirits and diethylene glycol. It is stable to 5% HCl, 2% NaOH and 2% acetic acid.

**Description:** Viridine pigment is supplied in 13 different forms for convenience, ease of processing, and to insure most satisfactory performance in wide variety of applications. These range from wet filter cake and alkyd dispersions for preparation of surface coating materials; through filled powders for plastics and inks; to water-soluble powders and pastes for beater addition to paper.

Cost of viridine pigment is comparable to commercially available phthalocyanine green.

(Heliogen viridine Y is a product of Dyestuff and Chemical Division, General Aniline and Film Corporation, 435 Hudson Street, New York 14, New York.)

Check 3339 opposite last page.

### Variety of uses predicted for versatile solvent, dimethyl sulfoxide

**Uses:** Product is currently being used to some extent as a spinning solvent for polyacrylonitrile fiber, an impregnating solvent, and as an ingredient in industrial cleaners.

**Features:** Variety of solvent characteristics suggests numerous potential applications. Strong hygroscopicity suggests use as a humectant for plastic films and paper. Other potential uses include: paint



stripper and hydraulic fluid; recovery of acetylene produced by pyrolysis of hydrocarbons; as a solvent in dyeing both natural and synthetic fabrics.

**Description:** Dimethyl sulfoxide,  $(\text{CH}_3)_2\text{SO}$ , has a molecular weight of 78.13 and melts at  $18.4^\circ\text{C}$ . The product is water white, nearly odorless liquid. It has a low capacity for paraffinic hydrocarbons and high capacity for aromatics, acetylene, highly unsaturated hydrocarbons and sulfur-containing compounds.

Compound is completely miscible with ethanol, acetone and similar water-miscible solvents as well as ether, benzene and chloroform.

(Dimethyl sulfoxide is a product of Chemical Products, Div., Crown Zellerbach Corporation, 343 Sansome St., San Francisco, Calif.)

Check 3340 opposite last page.

#### **Epoxy, laminating resins and safety hardeners are non-irritating**

**Uses:** Resins can be used for reinforced plastic tools and parts and other laminating applications.

**Features:** Non-irritating epoxy laminating systems and safety hardeners are specifically formulated to reduce or eliminate allergenic reactions which sometimes occur in susceptible individuals. Catalysts are non-fuming, and relatively odorless. Non-hygroscopic character permits them to set up even under humid conditions.

**Description:** Two resins are offered: 607-AA has excellent wetting characteristics that make it particularly suitable for glass-fiber-reinforced products; 606 is a brilliant white gel coat useful as a surface coating of molds or models where glass-fiber pattern or texture should not show. Both resin systems have a pot life of 15 to 20 minutes.

(Epoxy resins 607-AA and 606 are product of Marblette Corp., 37-31 Thirteenth Street, Long Island City 1, N.Y.)

Check 3341 opposite last page.

## **metallic catalysts speed synthesis of NEOPENTYL GLYCOL POLYESTERS**

**Report from Eastman research**

**direct polyesterification on  
commercial scale now practical**

**derivatives noted for resistance  
to heat, water and sunlight**

Direct polyesterification reactions of neopentyl glycol with dibasic acids have been under intensive study at Eastman's Development Laboratories for more than a year.

Results of this work show that the long reaction period normally associated with the preparation of neopentyl glycol polyesters may be shortened considerably through use of the proper metallic catalyst system.

The study demonstrates, too, that the problems of side reactions, color formation and polyester cracking, which attend lengthy reaction periods at high temperatures, are minimized through shorter reaction times.

A report on the nature of the catalyst evaluated and the procedures and techniques employed is available upon request.

Interest in polyesters based on neopentyl glycol stems from the stability characteristics it possesses and, in turn, imparts to its derivatives.

These stability characteristics are attributed to the compact, symmetrical molecular configuration of neopentyl glycol, and, in particular, to the presence of the two methyl groups on the central carbon atom.

For example, when neopentyl glycol is condensed with a dibasic acid it results in an easy-processing plasticizer of moderate molecular weight that exhibits permanence properties equal or superior to those of polymeric plasticizers of higher molecular weights.

Eastman offers such a product in its polymeric plasticizer NP-10.

Certain hydroxy-terminated polyesters of neopentyl glycol show promise in the manufacture of both rigid and flexible polyurethane foams.



These foams feature better tensile properties and improved resistance to sunlight and heat.

Unsaturated polyester resins made with neopentyl glycol can be formulated to meet an extended range of desirable mechanical requirements.

The electrical properties of several of these suggest their use in insulating varnishes.

Other polyesters made with neopentyl glycol, because of their hydrolytic stability, may be useful as water-soluble resins.

Among other derivatives of neopentyl glycol that warrant investigation are unsaturated polyester resins for cross linking with styrene; monoesters through diester interchange with neopentyl glycol for hydraulic fluids; and diesters for lube oil additives and for synthesis of specialized lubricants.

A copy of the technical data report describing this study as well as samples of neopentyl glycol may be obtained through your Eastman Chemical sales office or from Eastman Chemical Products, Inc., Chemicals Division, Kingsport, Tennessee.

## **Eastman**

**CHEMICAL PRODUCTS, INC.**

subsidiary of Eastman Kodak Company

KINGSPORT, TENNESSEE

**SALES OFFICES:** Eastman Chemical Products, Inc., Kingsport, Tenn.; Atlanta; Chicago; Cincinnati; Cleveland; Detroit; Framingham, Mass.; Greensboro, North Carolina; Houston; New York City; Philadelphia; St. Louis. **West Coast:** Wilson Meyer Co., San Francisco; Los Angeles; Portland; Salt Lake City; Seattle.

Check 3342 opposite last page.



**HIGH EFFICIENCY  
DUCCLONES®**  
assure maximum recovery  
at lowest cost

DUCCLONES—Ducon high efficiency cyclones—are designed and constructed for high recovery efficiency and low gas resistance. Their sturdy construction assures long, continuous service with a minimum of maintenance.

The exceptional performance of Duclone collectors is the result of these 6 unique features:

1. Small Diameter produces high efficiency
2. Helical Roof provides a turbulence-free path for the entering gas stream
3. Steep Cone improves dust separation
4. Dust Trap assures efficient dust removal from the cone
5. Vortex Shield prevents re-entrainment of dust in upward gas vortex
6. Scroll Outlet provides a low resistance clean gas outlet

send for Bulletin C-958.



the  
name in  
DUST  
CONTROL

**THE DUCON COMPANY, INC.**  
147 EAST SECOND STREET • MINNEAPOLIS, L. J., NEW YORK

Check 3343 opposite last page.

## CHEMICAL MATERIALS

**Reactive structure  
marks intermediate  
for organics**

Product now available commercially

Uses: As an intermediate in organic and pharmaceutical synthesis.

Features: With reactive groups at both ends of molecule, intermediate presents many possibilities for work in polyesters, nylon, and other products. It is now available commercially.

Description: Material, 1,3-propylene glycol, is available in both technical and pure grades.

Basic Data	
Pure	99
Purity, %	
Form	Liquid
Color	None
Odor	None
Sp gr 20°C	1.0537
Boiling Pt, °C	210-211
Technical	
Purity, min %	95
Impurities	
Major	Water
Minor	Glycerine
Color	Light yellow

(1,3 Propylene glycol is the product of Aceto Chemical Company, Inc., 40-40 Lawrence St., Flushing 54, N.Y.)

Check 3344 opposite last page.

### Latex systems profit from stable trio of defoamers

Three defoamers for general industry and paint systems should be of particular interest to latex paint producers.

Defoamer 2892 is a buff-colored flowable liquid with mild odor. It is non-ionic, completely stable and does not vary in consistency under normal temperature changes. It can be used as a defoamer or as an anti-foaming agent for various latex systems such as butadiene styrene, PVA or acrylic. Recommended usage is 0.1 to 0.3% on a weight basis.

Defoamer 1961 is a light-red, thin flowable liquid and may be added directly to system or premixed with one or more system constituents. It

## Pleasing Odor = More Sales consider resodors\*!

### RUBBER

A soft talc odor helps sell baby pants. A soap-fresh fragrance adds buy-appeal to shower curtains. Hand bags with a simulated leather odor have a real competitive advantage.

Perhaps an appealing odor—or freedom from objectionable odor—is just what your product needs!

SINDAR can give you expert assistance. Our RESODORS were specifically



### PLASTICS

developed for use in plastics and rubber. They are easy to use—just add the oil at any convenient point in your process. They'll stand up under your temperatures too.

There's a RESODOR to give your product exactly the right odor appeal. May we send you samples and put our experience to work for you?

\*Trademark

**SINDAR® Corporation**  
Industrial Aromatics and Chemicals

321 West 44th Street • New York 36, N. Y.

Check 3345 opposite last page.

## TOWER PACKINGS

Designed for Service!

Raschig Ring

Single-Partition Ring

Cross-Partition Ring

Berl Saddle

Tellerette

More than 35 years production experience in the field of fine quality porcelain, plus the finest of materials . . . That's KNOX!

Tower Packings by KNOX resist high temperatures, fumes, vapors, corrosion, liquids, alkalis and acids. Non-porous—complete vitrification firing at 2300° F. provides zero porosity, assuring an indefinite life chemically. Combined with uniform quality, high chemical purity, iron-free, great mechanical strength, will not crumble.

Body composition excels the most exacting requirements.

**IRON FREE**

**KNOX PORCELAIN CORPORATION**  
KNOXVILLE 1, TENNESSEE

Always Specify  
**KNOX**  
Tower Packings

Check 3346 opposite last page.

CHEMICAL PROCESSING

is non-ionic, stable, and requires no special care during storage prior to use. Recommended usage is 0.1 to 0.3% on a weight basis. Product is particularly recommended for butadiene-styrene latex system.

**Defoamer 3503** is recommended for general defoaming use, particularly in adhesive field. It is a flowable buff-colored liquid that may be added directly to system or premixed with system constituents. Recommended usage is 0.2 to 0.5% by weight.

(Eldefoam 2892, 1961 and 3503 are products of El Dorado Division, Foremost Food and Chemical Company, PO Box 599, Oakland 4, Calif.)

Check 3347 opposite last page.

#### Long pot life for epoxies of 100% solids content through curing agents

Solventless epoxy resin coatings can now be applied with convention spray application equipment. Introduction of two curing agents (H-1, H-2) provides usable pot life greater than that obtained with earlier materials. As a result, properly formulated solventless epoxy resin coatings can be applied with conventional equipment without danger of polymerized material fouling spray gun. It is possible to apply a single coat up to ten mils without bubbling or sagging from a vertical surface.

Since use of these curing agents does not require volatile components, coating is well suited for application in areas where solvent vapors might present a fire hazard.

Agents can also be used to cure solvent-based coatings. An enamel utilizing them was reported still sprayable up to five days after mixing. Coatings show practically no curing-agent blush even when applied and cured at 70% relative humidity.

(Curing agents H-1 and H-2 are products of Shell Chemical Corporation, 50 West 50th Street, New York 20, N. Y.)

Check 3348 opposite last page.

## BRIEFS

some talk about thionyl chloride  
... plasticizer for vinyl chlorides  
... benzyl groups



#### CHLORINATE OR SULFONATE WITH THIS INTERESTING INORGANIC

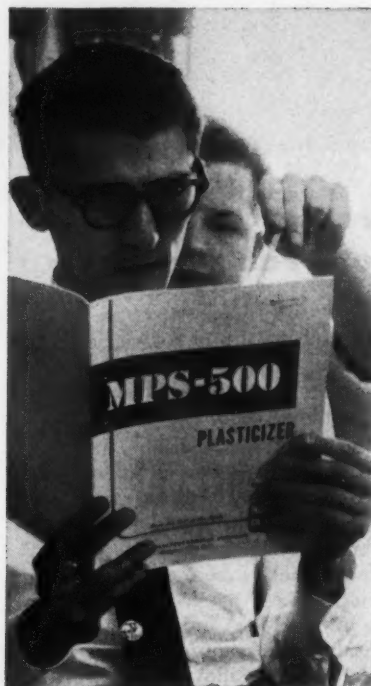
Sometimes you'll find it's easier to work with thionyl chloride than with pure chlorine or sulfur.

It makes an excellent chlorinating agent. You can also use it to introduce sulfur or oxygen and sulfur.

You can get Hooker thionyl chloride in two grades. The technical grade is 93% pure min. and distills between 72° and 79°C. It is shipped in steel drums.

You get 97.5% min. purity when you buy the refined grade. It distills between 75° and 78°C. and comes to you in glass carboys or in nickel drums. It contains less than 5 ppm iron.

Our data sheet on thionyl chloride will give you more technical data. Why not send for it today?

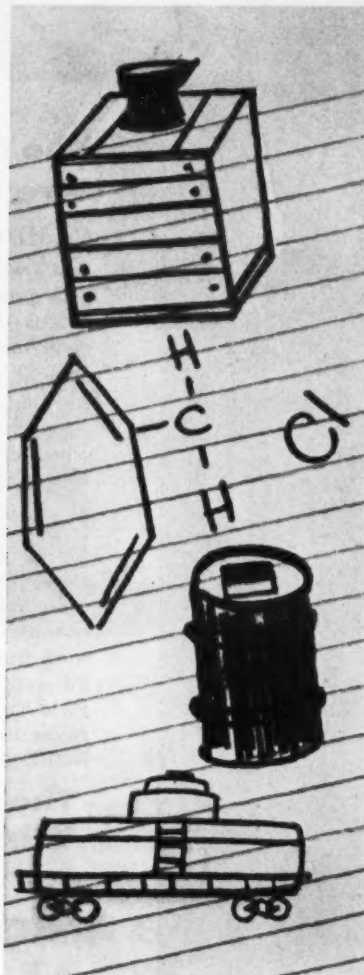


#### POLYVINYL CHLORIDE FORMULATORS

We offer a plasticizer that can improve your compositions five ways: Imparts flame retardance. Gives higher resistance to water, oil, gasoline. Gives high permanence on heating. Gives high tensile strength joined with high flexibility. Lessens migration. It's called MPS-500.® It's a stabilized chlorinated ester of a fatty acid and is completely compatible with PVC polymers in ratios as high as 60 parts per 100. Check coupon for bulletin and technical data sheet.

#### HANDY WAY TO GET BENZYL GROUPS

Our benzyl chloride offers a simple, economical intermediate for introducing benzyl groups in a reaction. It's a clear and colorless (or light yellow) liquid, insoluble in water but completely miscible with alcohol and ether. Quantity is no problem: order carboys, drums, tank trucks, or tank cars. Benzoyl groups are easy to come by, too, since we offer benzoyl chloride and the *meta* and *para* isomers of nitrobenzoyl chloride. Check coupon for data sheets on products of interest.



For more information, check here and mail with your name, title and company address.

- ☐ Thionyl chloride    ☐ Benzoyl chloride    ☐ Para-nitrobenzoyl chloride  
☐ MPS-500    ☐ Benzyl chloride    ☐ Meta-nitrobenzoyl chloride

#### HOOKER CHEMICAL CORPORATION

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Sales Offices: Buffalo Chicago Detroit Los Angeles New York  
Niagara Falls Philadelphia Tacoma Worcester, Mass.  
In Canada: Hooker Chemicals Limited, North Vancouver, B. C.

**HOOKER**  
CHEMICALS  
PLASTICS

Check 3349 opposite last page.





## Who cares about your Wire Cloth Fabrications?

*CAMBRIDGE does . . .*

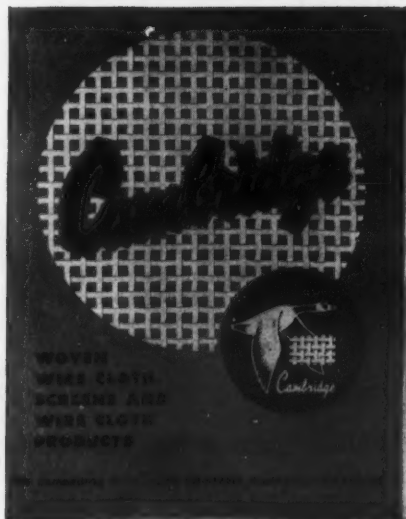
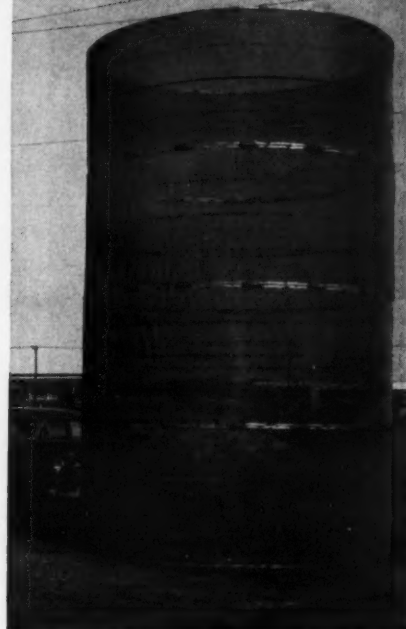
that's why you automatically get service with your order . . . whether you need dozens of midget strainers or a single giant-sized retaining screen.

Careful, competent workmanship and constant inspection assure you of quality . . . modern machinery and accurate scheduling assure you of prompt delivery. And, a Cambridge Field Engineer follows up your order to make sure our product is giving you the best possible service. Let us quote on your next order for wire cloth fabrications. We manufacture wire cloth from any metal or alloy—including titanium—in nine basic weaves. We'll work from your prints or draw up prints for your approval. Call your Cambridge Field Engineer . . . he's listed in the yellow pages under "Wire Cloth". Or, write for FREE 94-PAGE CATALOG.

### The Cambridge Wire Cloth Co.

Department F • Cambridge 2, Md.

Manufacturers of Wire Cloth,  
Metal-Mesh Conveyor Belts, Wire Cloth Fabrications



Check 3350 opposite last page.

## CHEMICAL MATERIALS

### High uniformity, purity found in this improved sodium lauryl sulfate

**Uses:** Product was especially developed for shampoo industry. It permits a full range of products from clear liquids to pastes.

**Features:** Low-viscosity and flat temperature-viscosity curve make product much easier to handle, particularly in cold weather. Precise control of minor constituents in sodium lauryl sulfate provides high uniformity from lot to lot and increased purity.

**Description:** Duponol QC is supplied as an aqueous, slightly viscous solution containing about 30% sodium lauryl sulfate. It is soluble in water in all proportions and can be used to obtain clear liquid shampoos with adequately low cloud points without addition of alkylolamine salts. A companion product, Duponol WAQUE, is designed for industrial applications.

(Duponol QC is a product of Dyes and Chemicals Div., E. I. du Pont de Nemours & Company (Inc.), Wilmington 98, Delaware.)

Check 3351 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

### Solid aluminum etchant non-scaling, dustless, easy to handle

**Uses:** Product is used to prepare aluminum etching solutions with minimum agitation.

**Features:** Material is supplied in solid form to provide easier handling with complete absence of dust. Solution produces a consistently durable satin etch on architectural aluminum, is non-scaling and eliminates sludge.

**Description:** Aluminum etchant, AE-16S, is packed in 90-pound metal containers

## CHEMICAL PROCESSING

## CHEMICAL MATERIALS

that open with hand tools. Material gives off no heat of solution. Caustic etchant contains organic ingredients to prevent sludging and scale formation.

(AE-16S Aluminum etchant is the product of Metal Processing Dept., Pennsalt Chemicals Corporation, Three Penn Center, Philadelphia 2, Pa.)

Check 3352 opposite last page.

### Impact strength up in ABS resin for extruded pipe

**Uses:** Extruding rigid thermal plastic piping.

**Features:** Resin exhibits superior impact strength at normal and low temperatures. Long-term burst strength is comparable or superior to conventional ABS (acrylonitrile-butadiene-styrene) materials.

**Description:** Improved resin, Cyclocac LL, has processing characteristics comparable to other resins in this class. It has been approved as a non-toxic material by the National Sanitation Foundation and is acceptable for use in potable water systems.

Izod impact value on a notched sample at 73°F was 8-10 ft lb. Charpy impact value of a notched sample at 73°F was 7.5 ft lb.

(Cyclocac LL is a product of Marbon Chemical Div. of Borg Warner, PO Box 68, Washington, W. Va.)

Check 3353 opposite last page.

### Four aluminas developed with narrow range particle size

**Uses:** Aluminas can be used in polishing and grinding compounds; preparation of phosphors; electrical ceramics; and catalyst carriers.

**Features:** Each type of alumina is controlled within a narrow range of particle size.

**Description:** Finely divided, high-purity alumina powders are available in developmental quantities. Alpha aluminas vary from 0.02 to 0.4 microns and from 99.7% min to

Recipes  
for Acrylic  
Emulsions...  
Redox  
Reflux

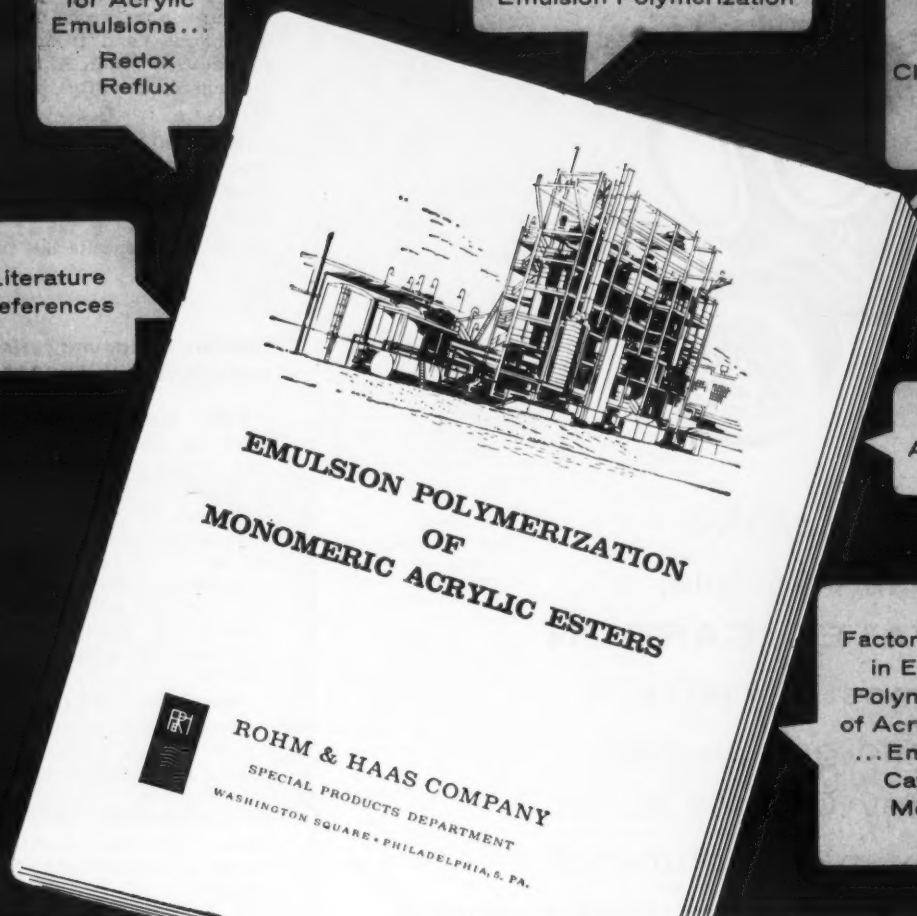
Plant Equipment for  
Emulsion Polymerization

Film  
Forming  
Characteristics  
of Acrylic  
Emulsions

Literature  
References

Industrial  
Applications

Factors Involved  
in Emulsion  
Polymerization  
of Acrylic Esters  
... Emulsifiers,  
Catalysts,  
Methods



## Technical Aid for Emulsion Producers

Here is a booklet full of valuable help for producers of polymer emulsions. In it, Rohm & Haas offers you laboratory recipes adaptable to both pilot plant and commercial operations, plus information on... emulsifiers, catalysts, methods of monomer addition... plant equipment... effect of polymer structure on the film-forming characteristics of acrylic emulsions... industrial applications and literature references on the use of acrylic emulsions in the leather, textile, paper, elastomer, paint, and other fields.

Rohm & Haas also offers (1) the broadest range of acrylic and methacrylic acids and esters available

from any one source and (2) over 25 years of engineering experience in the transportation, storage, and handling of acrylic monomers. Write today to Dept. SP-2 for your copy of this new 18-page booklet.



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COMPANY**

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Rohm & Haas Acrylic Monomers used in emulsion polymerization...  
**METHYL ACRYLATE • ETHYL ACRYLATE • BUTYL ACRYLATE • 2-ETHYLHEXYL  
ACRYLATE • METHYL METHACRYLATE • ETHYL METHACRYLATE • BUTYL METHACRYLATE  
GLACIAL ACRYLIC ACID • GLACIAL METHACRYLIC ACID**

Check 3354 opposite last page.



Using the positive gas mask principle, **ACTIVATED CARBON** is the most versatile liquid and gas purifier. Barnebey-Cheney is the only manufacturer of **ALL** types of activated carbons. It's the only business we know... and we know it well.

	natural grain sizes	pelletized	powdered
nut shells	✓	✓	✓
wood	✓	✓	✓
coal	✓	✓	✓

Ask for literature J-103. Send us your problem to solve. Barnebey-Cheney, Columbus 19, Ohio.

# Barnebey Cheney

Check 3355 opposite last page.

## CHEMICAL MATERIALS

99.96% min  $Al_2O_3$ . Gamma aluminas vary from 0.002 to 0.1 microns and from 99.7% min to 99.96% min  $Al_2O_3$ . Development quantity price is \$15/lb.

(Alpha and gamma aluminas are product of J. T. Baker Chemical Company, Phillipsburg, N.J.)

Check 3356 opposite last page.

### Molding compound resists temperature to 6000°F

**Uses:** Material was developed specifically for missile and rocket construction as a high-temperature insulation. It should be valuable wherever temperatures of a similar nature are encountered.

**Features:** Moldings will withstand temperatures to 6000°F for limited periods, and sustained temperatures to 1000°F.

**Description:** Material is a compounding of highly refined fibrous potassium titanate with high-temperature phenolic resin. Material may be easily molded in conventional matched dyes and cured in conventional ovens. Density is 1.6 lb/cu ft.

(Resistotemp molding compound is a product of Resisto Chemical, Inc., Wilmington, Delaware.)

Check 3357 opposite last page.

### Low-foaming stable latex permits high solids paint formulations

**Uses:** Product is designed for water-based industrial finishes with high-solids content.

**Features:** High-molecular-weight polymer is characterized by extremely low foaming tendency and good mechanical stability. Latex is suitable for high-solids industrial paints with good application properties, and corrosion and water resistance.

**Description:** Latex polymer has the following characteristics:

Solids, %	48 ± 1
Sp gr, 20/20°C	1.02
Lb/gal	8.45
pH of latex	7.5-8.0
Viscosity, cps (-25°C)	40-70
Foamability, % (volume increase)	140

Latex foams based on this product, containing small amounts of metallic driers, have resulted in thermo-setting, cross-linked films when baked at elevated temperatures. Adhesion and water resistance of these films are good.

(Dylex KCD-141 latex is a product of Plastic Division, Koppers Company, Inc., 801 Koppers Building, Pittsburgh 19, Pa.)

Check 3358 opposite last page.





## NEW LITERATURE

### Chemical Materials

**Silicone antifoams**<sup>\*</sup> use in controlling costly foaming problems is one of a variety of subjects covered in eight-page brochure Bul CDS-204—Silicone Products Department, General Electric Company.

Check 3359 opposite last page.

**Styrene-butadiene copolymer latex** is discussed in detail in 30-page technical bulletin which describes particle size, foam, water resistance and scrubability. Tech Bul C-9-285—Plastics Division, Koppers Company, Inc.

Check 3360 opposite last page.

**Hexachlorophene** supplementary bibliography covers physical and chemical properties, product uses, test methods, and toxicological properties. Abstracts of 27 literature and patent references are given. "Sindar Reporter No. 3"—Sindar Corporation.

Check 3361 opposite last page.

**Guide to plastics tooling materials** for metal-forming and plastics-forming industries is presented in two-page data-sheet supplement. Chart uses color bands for quick differentiation between product groups. Resins are listed numerically within each grouping. "Maraset Tooling Resins"—Marblette Corp.

Check 3362 opposite last page.

**Urethane casting resin** brochure describes physical and electrical properties and includes new formulations requiring no plasticizers. Bul S-113-3A—Thiokol Chemical Corporation.

Check 3363 opposite last page.

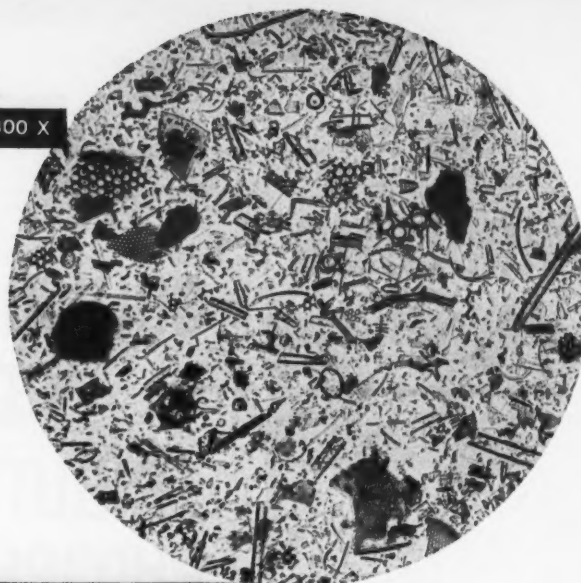
**Butylene oxide** bulletin discusses potential utility of product and its derivatives as stabilizers, solvents, petroleum additives, plasticizers, catalysts and variety of other products. Bulletin also includes properties in handling information. "Butylene Oxide"—Dow Chemical Company.

Check 3364 opposite last page.

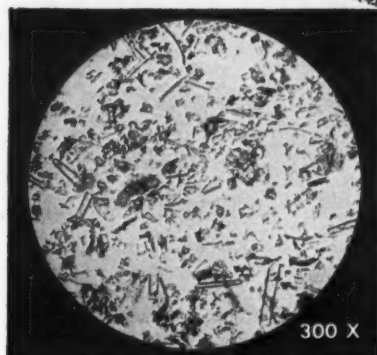
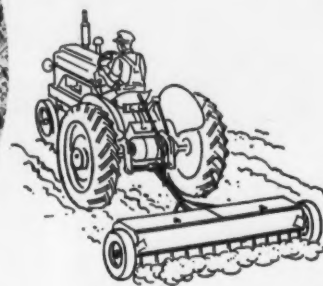
**Blowing urethane foams** with fluorinated hydrocarbons is method presented in brochure which discusses recent developments in foam making techniques. Brochure lists growing uses for urethane foams and includes a chart comparing physical properties of most widely used insulating and cushioning materials. "Blowing of foams with Isotron"—Pennsalt Chemicals Corporation.

Check 3365 opposite last page.

300 X



**For fertilizer coating**—Celite 379, a natural milled diatomite, provides the uniform conditioning needed to prevent caking of granular, mixed or prilled fertilizers—maintains good free-flow characteristics even after prolonged storage.

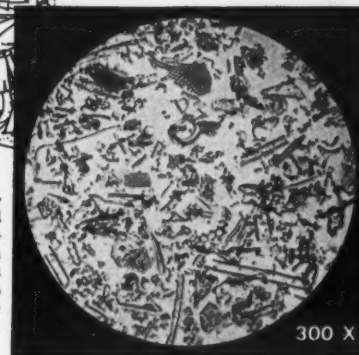


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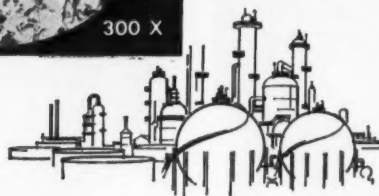
**For catalyst carriers**—Super Floss, finest particle size flux-calcined Celite grade, is used where a non-reactive porous silica support is needed. (Also available: special Celite supports in many preformed shapes for strength, high temperature stability, resistance to abrasion and attrition.)



**As a paint-flattening agent**—Celite 281, air-floated fines of flux-calcined diatomite, provides uniform and efficient flattening at low cost. Contributes to control of low angular sheen, durability, and faster drying.



300 X



*In diatomites, Johns-Manville precision processing works for you*

## Celite diatomite absorbs its own weight of liquid...yet stays 'dry'

No matter which of the many available grades you choose, you can depend on a given volume of inert Celite<sup>\*</sup> to retain its typical dry-powder characteristics even after absorbing its own weight of liquid.

Actually, Celite can absorb a total of more than twice its own weight. That's because a mass of the fine skeletal particles is approximately

93% air space or voids. Yet, in spite of this very high porosity, Celite is essentially non-hygroscopic.

Other unique properties—extremely high bulk, irregular particle shape and large available surface area—ideally suit Celite to hundreds of mineral filler applications. It is produced with precision from the world's purest commercially available dia-

tomite deposit. It offers a wide choice of grades, each carefully controlled for complete uniformity.

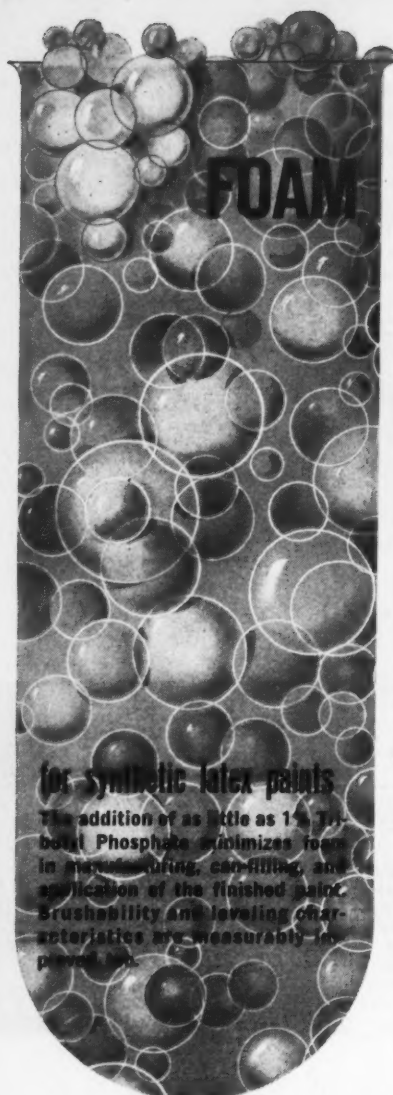
For technical data on specific mineral filler or filtration problems, talk to your nearby Celite engineer. Or write to Johns-Manville, Box 14, New York 16, N. Y. In Canada, Port Credit, Ontario.

\*Celite is Johns-Manville's registered trademark for its diatomaceous silica products

# JOHNS-MANVILLE



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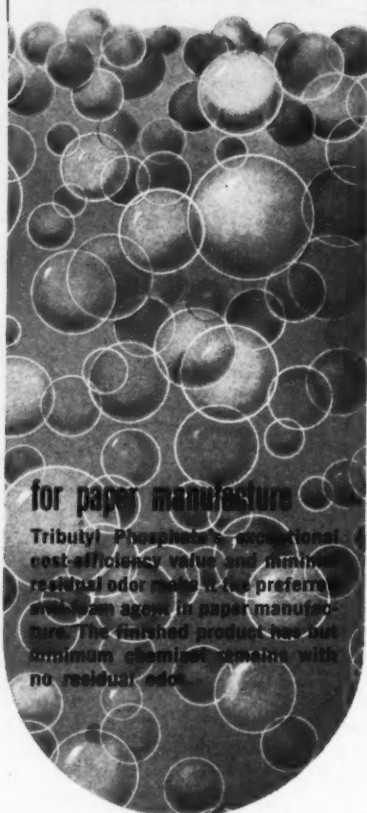


## FOAM

### for synthetic latex paints

The addition of as little as 1% Tributyl Phosphate minimizes foam in manufacturing, can-filling, and application of the finished paint. Brushability and leveling characteristics are measurably improved.

## PROBLEMS



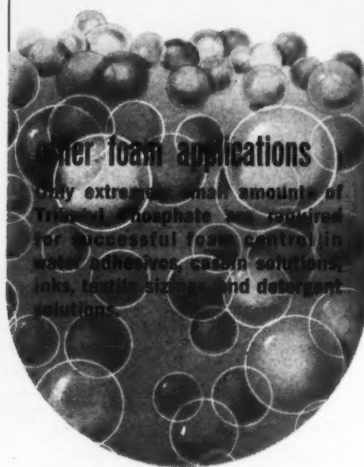
### for paper manufacture

Tributyl Phosphate's exceptional cost-efficiency value and minimum residual odor make it the preferred foam agent in paper manufacture. The finished product has but minimum chemical residue with no residual odor.

## SOLVED with



## TRIBUTYL PHOSPHATE



### water foam applications

Only extremely small amounts of Tributyl Phosphate are required for successful foam control in water adhesives, casein solutions, inks, textile sizing, and detergent solutions.

### PHYSICAL PROPERTIES

Tributyl Phosphate is colorless, odorless . . . miscible with most common organic solvents, and is an excellent solvent for a great variety of other materials. It has a surprisingly low melting point for such a high-boiling liquid.

### Specifications:

Specific Gravity 20/20°C	0.977 - 0.979
Acidity (as phosphoric acid)	0.01% (by weight) maximum
Color, APHA	15 maximum
Moisture, Karl Fischer	0.3% maximum
Free Butanol	0.2% maximum
Appearance	Clear and free of suspended matter

### GOT FOAM PROBLEMS? MAIL COUPON TODAY!

Industrial Chemicals Dept.  
Commercial Solvents Corp.  
260 Madison Ave., New York 16, N. Y.

Please send me further information on CSC Tributyl Phosphate as an anti-foam agent for \_\_\_\_\_

Name \_\_\_\_\_  
Title \_\_\_\_\_  
Company \_\_\_\_\_  
Street \_\_\_\_\_  
City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

INDUSTRIAL CHEMICALS DEPARTMENT

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IN CANADA: McArthur Chemical Co. (1959) Ltd., Montreal • IN MEXICO: Consolmex, S. A., Mexico 7, D. F.



Check 3367 opposite last page.

**Nylon stock shapes** and range of available shapes, sizes and properties are detailed in 8-page brochure. Physical properties of available grades are charted and data on moisture conditioning, machining, bonding, welding and coloring of nylon parts are given. "Cadco Nylon"—Cadillac Plastic & Chemical Company.

Check 3368 opposite last page.

**Paint additives** wall chart presents condensed use guide for dispersing agents, dryers, bodying agents, stabilizers, and other additives. Use concentration, properties obtained, and incorporation procedure are included. "Using Nuodex Additives" — Nuodex Products Company, Division of Heyden Newport Chemical Corporation.

Check 3369 opposite last page.

**Iodine** and its inorganic compounds are listed in tabular form in 687-entry compilation of physical properties, "Physical Properties of Iodine and Its Inorganic Compounds"—Chilean Iodine Educational Bureau, Inc.

Check 3370 opposite last page.

**Flating agent** of silica aerogel is treated in data sheet containing physical and chemical properties as well as nitrocellulose and vinyl lacquer performance records. Bul I-177—Inorganic Chemicals Div., Monsanto Chemical Company.

Check 3371 opposite last page.

**Trichlorofluoromethane's** use in rigid fire-resistant polyurethane foams is subject of technical bulletin. Supplementary information covers safety precautions and shipping containers. Bul 14 — Hooker Chemical Corp.

Check 3372 opposite last page.

**Compounding natural rubber** for heat resistance through choice of cross linking system, protective agents and fillers is subject of 24-page, pocket-sized booklet. Five techniques are listed for obtaining maximum life for natural rubber at high temperatures. Tech Bul 3—Natural Rubber Bureau.

Check 3373 opposite last page.

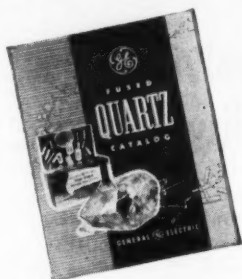
**Plastics-polymer research** report contains a bibliography of selected reports and translations in fields of plastics and polymers made available to public during the past five years. Comprehensive listing includes AEC documents and translations of foreign technical literature as well as reports of Army, Navy and Air Force research. SB-400 may be obtained at \$0.10 per copy from Office of Technical Services, Department of Commerce, Washington 25, D.C.



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ON CLEAR AND  
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**YOU'LL FIND** complete information on fused quartz including discussions on mechanical strength, low coefficient of expansion, and its electrical and chemical properties. Graphic comparison of the ultraviolet, visible and infrared transmission of fused quartz and various glasses. It explains why fused quartz does most jobs better in laboratories and industry.



**G-E FUSED QUARTZ CATALOG** completely covers the physical sizes available from General Electric—plus:

- Single, double bore, and capillary tubing
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- Laboratory quartzware—standard items or to your specifications
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Most Important Product*



**GENERAL  
ELECTRIC**

Check 3374 opposite last page.

FEBRUARY 1960

## CHEMICAL MATERIALS

**Fatty acid esters'** uses in textiles, paints and lacquers, plastics and inks are comprehensively treated in 40-page catalog which lists specifications, physical properties and solubility data. "Esters for Industry"—Kessler Chemical Company, Inc.

Check 3375 opposite last page.

**Government specifications** covering adhesives, sealants, paints, cleaning compounds and chemical compounds are listed in compilation of 1000 entries. Listing is divided into eight sections according to federal class numbers and has a complete numerical index. "Government Specifications"—Magic Chemical Company.

Check 3376 opposite last page.

**Epoxy resins** are subject of 24-page technical brochure listing chemical and physical properties, specifications, applications, handling and storage, and toxicity. Most data is presented in easy-to-use chart form. Tech Bul 10A—Chemical Division, General Mills, Inc.

Check 3377 opposite last page.

**Industrial and consumer chemicals** are reviewed in 36-page, two-color product catalog and directory. Catalog lists specifications, end-uses, and technical data for more than 1000 products. Included are polymers, coating materials, fine chemicals, organic intermediates, and bio-chemical reagents. "Product Catalog"—The Borden Chemical Company Div., The Borden Company.

Check 3378 opposite last page.

**Adhesives for vinyl, polyethylene, polyurethanes, Mylar, wood, metal and glass** are outlined in pocket-sized adhesive review. "New Adhesives"—Adhesive Products Corporation.

Check 3379 opposite last page.

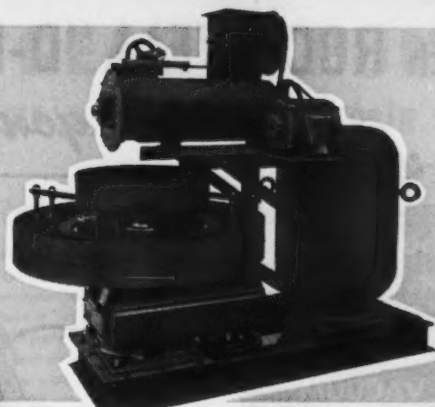
**Guar gum** is subject of 16-page booklet containing information on physical and chemical properties. Included are data on electrolyte compatibility, settling properties, and application as a filtering and flotation agent. "Jaguar"—Stein Hall & Co., Inc.

Check 3380 opposite last page.

**Vinylpyrrolidone copolymers** with vinyl acetate, and their numerous applications, are detailed in 20-page publication which describes stability factors' viscosity ratings, compatibility and physiological data. Recently developed uses are outlined. Bul-AP-88 Rev.—Antara Chemicals, General Aniline & Film Corporation.

Check 3381 opposite last page.

**NEW  
SOLUTION  
To Your  
PELLETING  
PROBLEMS**



**Daffin**

**PELLETING MACHINERY**  
GREATER OUTPUT AT LOWER COST

Pellets of **SUPERIOR** uniformity, density, firmness, with or without steam and binders. From 1/8" to 1" diameter—lengths to 2" or more—round and other shapes—coarse or fine materials.

Unique, new, simplified design. Easier, more economical to operate, maintain. Special stationary die, horizontal head. Alloy construction as required. Daffin engineers will help develop exclusive pellet processing system tailored to your operation. **WRITE FOR FREE BULLETIN L-109**

Complete  
plant  
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50 sq. ft.



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INDUSTRIAL DIVISION  
3353 NORTH PRINCE STREET, LANCASTER, PENNSYLVANIA

Check 3382 opposite last page.

**MIX BETTER BY**

# IMPACT



Finer and more intimate dispersion of solids can be achieved using an Entoleter® centrifugal impact mill.

- Low cost — low power requirements
- Minimum (controlled) temperature rise

### RECENT APPLICATION

For the final dispersion of detergent, bleach, perfume and highly abrasive silica flour in a popular powdered household detergent, this 27" model with abrasion resistant impactors does the job.

Send for literature on Impact Milling, Particle Size Reduction and the new line of Vibrating Screens.

Free test runs  
on your material.



**ENTOLETER**  
DIVISION OF SAFETY INDUSTRIES, INC.

Check 3383 opposite last page.



# with ROCKWELL "D-D" VALVES *you're Sure - you're Safe!*

The BEST

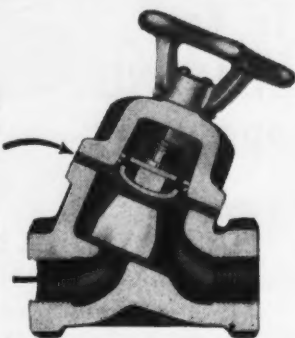
for

- CORROSIVE
- ABRASIVE
- VACUUM
- DIFFICULT

*Service*

DIAPHRAGM  
for Positive  
Sealing

DISC for  
Positive  
Closure



**OPERATION** Disc absorbs action of fluid flow and pressure, and cuts off fluid on closure. Diaphragm merely seals mechanism from valve body. Failure of diaphragm does not prevent closing the valve. Hence—longer diaphragm life—less maintenance. Oversized ports for higher capacity.

**CONSTRUCTION** Valve bodies of cast iron, stainless steel, or lined with rubber, Neoprene, Penton, other plastics or glass. Diaphragm discs of rubber or Neoprene. Flanged — ½" to 6" sizes; screwed or union ends — ½" to 2" sizes. Write for Bulletin 800C.



**W.S. ROCKWELL COMPANY**

2200 ELIOT STREET • FAIRFIELD, CONN.

VALVES — Butterfly • Slide • Gate • Check • Diaphragm • Plastic

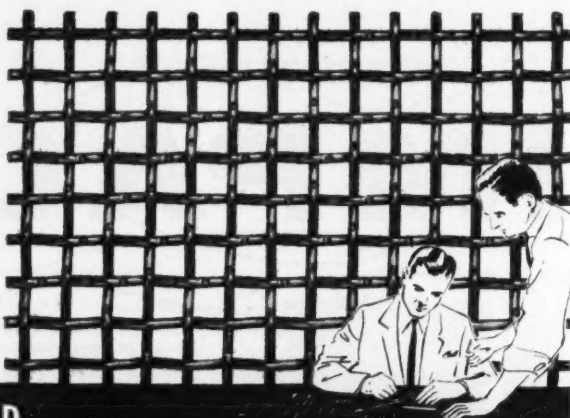
Check 3384 opposite last page.

Filtration

Straining

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**CLEVELAND**

**Has the Answer to All Wire Cloth Problems**

• Whether your problem is bulk or fabricated parts, filtering, straining, screening or catalyst, get in touch with Cleveland. Over 40 years experience in the weaving and fabrication of industrial wire cloth provides the answers to your screen problems.

Immediate shipment of many standard meshes or weaves from stock. Fabrication into products is our engineering specialty.

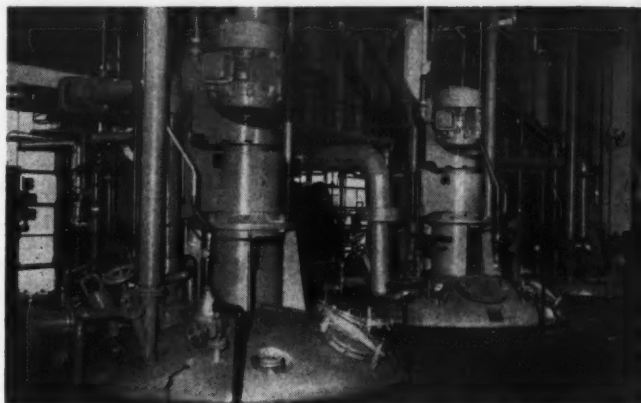
SEE OUR AD IN CEC

Send your specifications or call today. We'll be glad to consult with you on your wire cloth problems without delay. Ask for Bulletin No. 10.

THE CLEVELAND WIRE CLOTH & MFG. CO.  
100 WEST 10TH STREET, CLEVELAND 5, OHIO • D11188

Check 3385 opposite last page.

**NEW SOLUTIONS**  
of processing problems



Tops of production reaction kettles at Rinshed-Mason

## Safe synthetic-polymer plant has built-in quality control

**Resins for top-quality finishes are made  
by closed, controlled solvent cooking**

**DANA B. BERG**, Managing Editor

with **PAUL J. KELLER**, Chief Chemical Engineer  
Rinshed-Mason Company, Inc.  
Detroit, Michigan

**P**roblem: Fusion cooking of resins at Rinshed-Mason Company, Inc., Detroit, never fully satisfied company engineers. The heating setup they had in existing kettles posed a potential explosion hazard . . . and developed hot spots which could char the resin and throw the batch off quality.

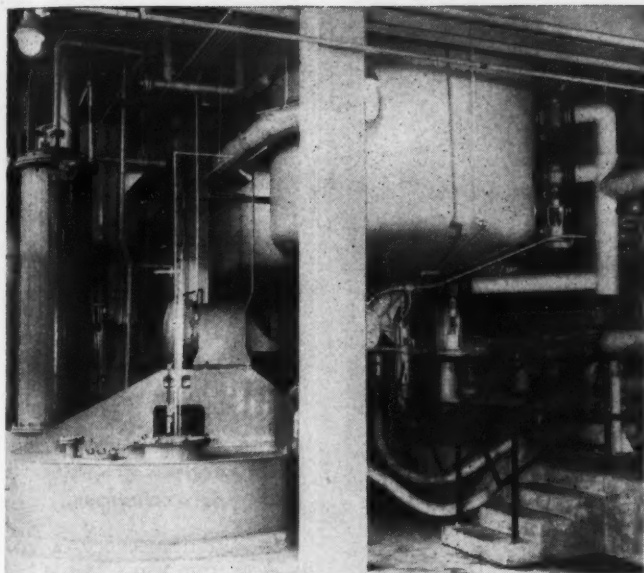
Since the system was not a closed one, the possibility of losing some of the more volatile constituents always existed. This, and the reverse — air getting into the batch — could also throw the resin off quality.

Rinshed-Mason makes acrylics, alkyds, epoxies, and other synthetic polymers for use in its line of automotive, furniture, other finishes.

**Solution:** When the company's new addition opened up in January 1958, it included three new resin production systems, side by side, using central Aroclor heating. Each is a closed system in which the solvent cooking method is used; solvent is continuously refluxed under automatic control.

Each system consists of an agitated reaction kettle, condenser, thinning tank, and related equipment. First and second system each has a 3500-gal kettle, 500-sq-ft condenser, and 7000-gal thinning tank. Third has 1000-gal kettle, 400-sq-ft condenser, and 2000-gal thinning tank.

All components, liquid and solid, are weighed into sys-



Lower portion of reaction kettles and upper portion of agitated thinning tanks

tem. (Solvent added to thinning tanks, however, is metered in volumetrically.) Solids, stored on top floor of building, are weighed into hopper scale which travels a track to service any of the three kettles. Liquids are pumped from outside storage into a weigh tank. Scale automatically stops flow when desired amount has been obtained. All batch weights and other associated data are printed by scale.

Each system has its separate panelboard from which conditions are controlled. Each kettle's jacket is divided into three independent peripheral segments to aid in temperature control. The one Aroclor heating unit can run the kettles at different temperatures, from 180 to 600°F. Materials can be cooled independently.

When reaction is complete, resin is dropped to thinning tanks, where the proper amount of solvent is added. From here the resin is drummed and taken to any further processing necessary in making a complete finish.

When water is a reaction

product, it is weighed continuously while cooking is in progress. This tells when reaction is complete. The water is continuously drawn off from the receiver of the reflux condenser, under supervision of an interface-control system.

#### Pilot Plant

In a separate section close by the production systems is a 100-gal pilot kettle and 25-sq-ft condenser, complete with controls identical to those used in the production systems. Ingredients for this are weighed out by hand for accuracy needed in the small system. Experimentation with new resins and cooking cycles are conducted here.

**Results:** Close control of conditions, plus the fact that a closed solvent cooking method is used, has assured high-quality, low-color, uniform resins — so necessary for the top-grade finishes of today. Operation of the closed system, heated by a method that doesn't offer a potential fire hazard, is safer. (Further safety is provided by entire

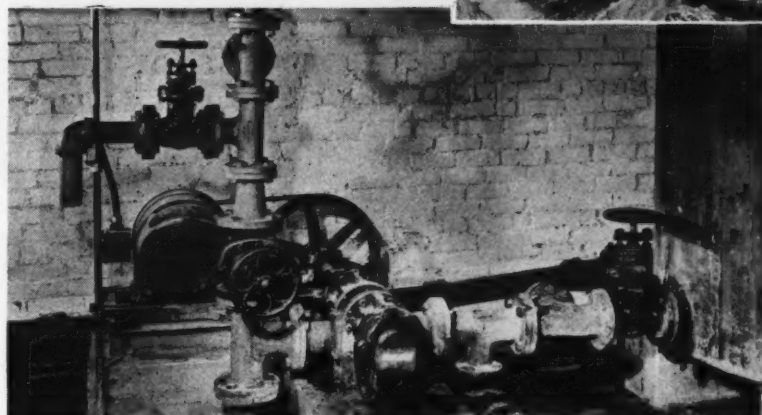
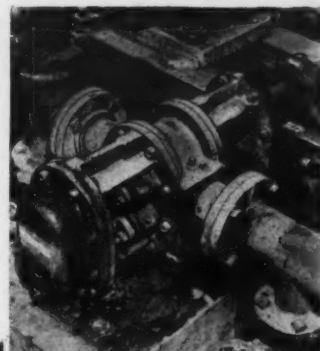
## Sier-Bath GEAREX® PUMP

cuts cost of pumping hot, viscous rosin size

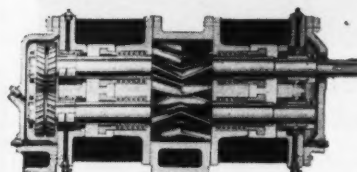
at

### American Writing Paper Corporation

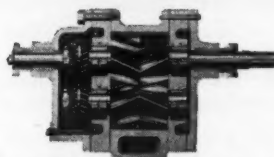
• Installed in 1957 to replace manual drum pumping, this Sier-Bath GEAREX Pump saves manpower and permits lower-cost tanklot purchases of rosin size. Operating intermittently 5 days a week, the GEAREX pump transfers about 500 gallons daily from storage tank to mixing vat 40 feet away, at a 10 foot elevation. Rosin size has a viscosity of 10,000 SSU at 180° F., discharging at 25 psig. pressure. Performance has been extremely reliable, with low operating and maintenance costs.



#### Sier-Bath "Gearex" Pumps



EXTERNAL GEAR & BEARING TYPE  
for non-lubricating liquids



INTERNAL GEAR & BEARING TYPE  
for lubricating liquids

Sier-Bath "Gearex" Pumps provide positive displacement, pulseless flow... quiet, vibrationless operation. Direct-connected up to 1800 RPM, they require no reduction gears. For high volumetric efficiency and long life there is no rotor-to-rotor or rotor-to-casing contact. Low pressure on stuffing boxes provides easy servicing.

Horizontal or vertical models to handle 32 to 500,000 SSU, 1 to 550 GPM at 250 PSI for viscous liquids, 50 PSI for water. Corrosion-resistant alloys, steam-jacketed bodies, water-cooled bearings, other adaptations to meet individual needs. See "Yellow Pages" for your local Sier-Bath Pump Representative or send for Bulletin G-2. Sier-Bath Gear & Pump Co., Inc. 2260 Hudson Blvd., North Bergen, N. J.

## Sier-Bath ROTARY PUMPS



Founded 1908

Mfrs. of Precision Gears, Rotary Pumps, Flexible Gear Couplings

Member A. S. M. A.

Check 3386 opposite last page.

# Costs Go Down with Foam



## Silicone Defoamer Beats Down Foam ...Defeats High Maintenance Cost

The chief engineer of a southern chemical plant periodically met real bugbears—foam boil-overs in a methanol-wood oil fractional distillation system. Such occurrences meant shutting down the still, while over 600 man hours were spent putting the unit back in condition.

That was before testing silicone defoamers. Now, foam's completely eliminated simply by adding only 5 parts per million of Dow Corning Anti-foam A. Boil-over clean-up man hours are nil. The chief engineer champions this silicone defoamer as the most effective system — says, "Without it, I'd simply go crazy."

If foam is fouling up your processing, putting you behind schedule and leaving you with too high a ratio of waste material, chances are you can lick foam once and for all — realize noteworthy savings through the use of Dow Corning silicone defoamers. Easy to use and economical, these silicone defoamers are widely used to overcome foam problems in processing varnish, paints, adhesives, asphalt, textile dyes, petrochemicals, foods and many other products.

Your nearest Dow Corning office is the number one source for information and technical service on silicones.



**Dow Corning CORPORATION**  
MIDLAND, MICHIGAN

ATLANTA BOSTON CHICAGO CLEVELAND DALLAS LOS ANGELES NEW YORK WASHINGTON, D. C.

Check 3387 opposite last page.



IN VARNISH COOKING

Job-proved as fastest and most effective for all processing operations, Dow Corning silicone defoamers are available in different forms for different systems. Why not make tests on the materials that are giving you foam problems?

A generous trial sample is yours for the asking. Write for this FREE SAMPLE, giving an indication of your problem and the type of system — oil, aqueous, non-aqueous, food product or other. Address Dept. 3202 for prompt reply.



FAST DISPERSING, FAST ACTING

## NEW SOLUTIONS

plant being equipped with explosion-proof equipment throughout, since it is impossible to prevent solvent escape entirely.)

Gravity flow from charging, down through kettles and into thinning tanks — along with the improved methods of weighing and charging — has minimized handling.

(Resin plant was designed, installed and started up by The Patterson Foundry and Machine Company, Division of Ferro Corporation, East Liverpool, Ohio.)

Check 3388 opposite last page.

## Zirconium recovery aided by impervious graphite grid-type exchanger

Successful recovery of zirconium from waste salt is being aided by use of an impervious graphite grid-type heat exchanger. The unit has satisfactorily withstood the corrosive conditions associated with the process.

Waste salt cake must be dissolved with hydrochloric acid in a 12-ft high agitated concrete tank. The grid-type heat exchanger is located vertically in tank. Bottom of heater fits into pocket at bottom of tank. A hold-down bracket at top of tank holds heater in place. Bracket is spring-loaded to allow for thermal expansion.

Careful design and rugged construction of the grid unit assures trouble-free service. The open space around and between the tubes permits free flow of the agitated solution, thus increasing rate of heat transfer and speeding the dissolving process.

Due to their high chemical resistance and heat transfer properties, similar units have found use in recovery of uranium, titanium, beryllium, hafnium, plutonium, and other rare metals.

(Nocordal impervious graphite grid-type heat exchangers are product of Heil Process Equipment Corp., 12901 Elmwood Ave., Cleveland 11, Ohio.)

Check 3389 opposite last page.



THAT'S  
INTERESTING

### Heavy water runs high

Heavy water made in two plants for nuclear reactors both in this country and abroad cost approximately \$15 a lb plus capital charges. Output of the plants—in Indiana and South Carolina—has been curtailed because of lack of demand. Plants had a combined capacity of 900 tons a year.

### Scale tale

Never a commodity to generate enthusiasm with wives of fishermen, fish scales are exciting much interest in concrete manufacturing. Concrete foamed with additive containing fish scales is most versatile. Density can be varied from 10 to 120 lb/cu ft; it can be pumped 250 ft vertically — 900 horizontally; reduced capillary bars moisture; a fine insulating material, it dries fast.

For more information on product at right, specify 3390 see information request blank opposite last page.



Here's the  
new

# HANDBOOK on MULLING

...take a  
measure of  
MIXING  
EFFICIENCY

SIMPSON  
MIX-MULLERS



A HANDBOOK ON MULLING

CONTROLLED  
DISPERSION  
FOR THE CHEMICAL  
AND PROCESS  
INDUSTRIES



For more on mulling . . .  
See our advertisement in your  
CHEMICAL ENGINEERING CATALOG

Take a yardstick to  
controlled dispersion . . .  
write for a copy  
of your new

**HANDBOOK  
ON MULLING**



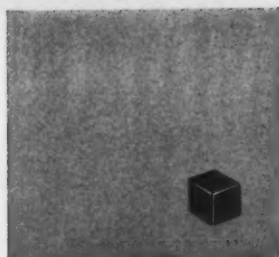
Will your materials preparation facilities *measure up* to the production and quality control standards that are already in sight for the '60s?

If you are in doubt and you mix dry solids, this 12-page bulletin is specifically designed to make you dissatisfied with "hit or miss" mixing practices. It reveals how *controlled dispersion* can be easily achieved in this era of high purity—high uniformity raw materials. And, how it is being achieved by Mix-Muller users . . . processors who have already realized that "cement mixer technology" takes an expensive toll at today's raw material prices.

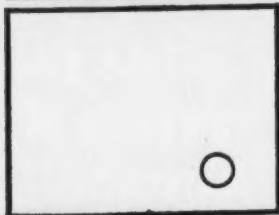
**SIMPSON MIX-MULLER® DIVISION**  
NATIONAL ENGINEERING COMPANY  
640 MACHINERY HALL BLDG., CHICAGO 6, ILLINOIS

P758

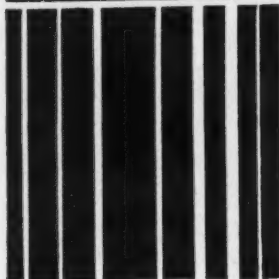




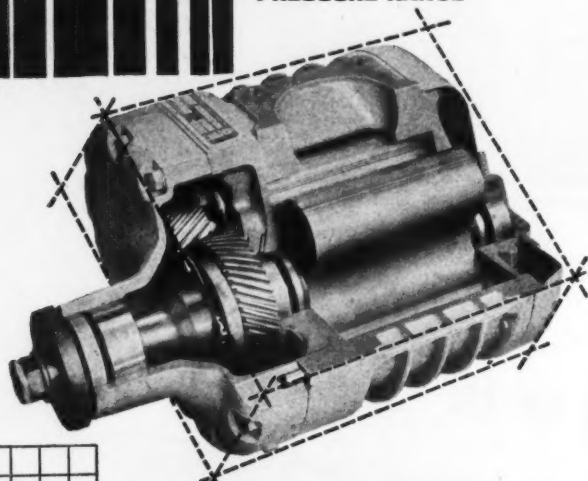
**SMALLEST CUBE  
DIMENSIONS**



**LIGHTEST  
WEIGHT**



**WIDEST  
PRESSURE RANGE**



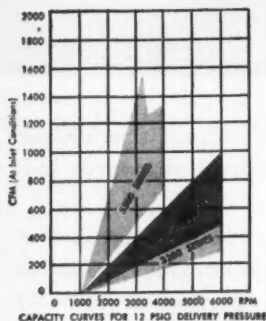
### WITH M-D 3-LOBE BLOWERS

If space and weight of the blower is a concern in your design problem, consider this fact. M-D rotary positive blowers because of their unique 3-lobe design require smaller cubic space than any other blowers. A survey shows that a 14 PSI M-D takes 3/4 to less than 1/10 the space of competitive models . . . and in some cases are only 1/10 the weight.

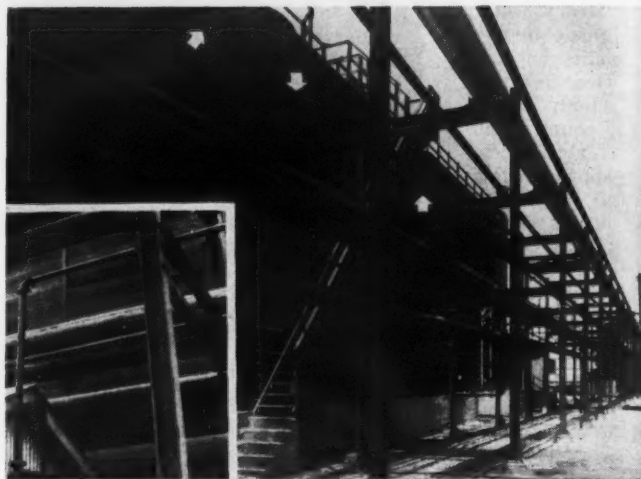
M-D Blowers operate at wider pressure and speed ranges than any other rotary positive blower. Capacities of 11 production models range from 50 to 4000 CFM, pressures to 14 PSIG single, 70 PSIG multi-stage.

For full information write

**M-D BLOWERS, INC., RACINE, WISCONSIN**  
A Subsidiary of Miehe-Goss-Dexter, Inc.



### NEW SOLUTIONS of processing problems



Arrows show two-inch PVC-lined pipe by cooling tower. Inset shows pipe, joined with Victaulic couplings, leaving chlorinator shed

## No extra supports needed for PVC-lined pipe

**Substantial savings result through  
use of steel-jacketed pipe — eliminates  
need for extra trusses**

**P**roblem: At the Port Arthur, Texas, refinery of Texaco Inc., it was necessary to run a two-inch line from a chlorinator unit 200' to the suction basin of the cooling tower for a naphtha stabilizer. Line was to carry a 0.05% chlorine-in-water solution to treat the cooling water and prevent algae formation.

Since the chlorine solution is fed through the line only at infrequent intervals and because there are no facilities to purge the line, corrosion-resistant piping was necessary. Plastic pipe appeared to provide an answer to the problem.

Conventional plastic pipe, however, lacked the strength to span the 22' spaces between support trusses of an existing pipe bridge parallel to

cooling tower. In order to use this type of pipe, a separate structure with supporting cross members on four-foot centers would be required.

Chlorine-in-water solution also had to be piped underground some 200' from another chlorinator unit to refinery's No. 3 power plant. This pipe had to be buried in soft, unstable earth that prohibited the use of conventional plastic pipe because it would have been subject to crushing.

**Solution:** Texaco engineers overcame both of these problems by specifying steel-jacketed PVC pipe for the two lines. This piping consists of PVC pipe with 0.065" wall thickness mechanically bonded to interior of electric resistant-welded carbon steel

Check 3391 opposite last page.

pipe with a 0.120" wall. A groove rolled in each end of 20' lengths accommodates Victaulic couplings.

PVC-lined pipe can handle liquids and gases at pressures to 1000 psi and temperatures to 150°F.

Pipe installed underground was coated and wrapped. Standard 20' lengths were used for overhead run. Victaulic couplings were used.

**Results:** Need to install additional support for overhead run of piping was eliminated at a substantial saving. Both installations are expected to give long service handling the chlorine water under corrosive conditions.

(Jal-Jacket PVC-lined pipe is product of Jones & Laughlin Steel Corporation, Three Gateway Center, Pittsburgh 30, Pennsylvania.)

Check 3392 opposite last page.

#### **Periscopes, electric eyes assist in uranium recovery process**

**Safeguard against radioactivity hazard**

Waste fission products previously stored in large steel underground tanks encased in concrete at Hanford, Washington, are being reprocessed to recover valuable uranium content. Consequently, material that was formerly considered to be a nuisance, is yielding a useful and valuable product.

#### **Removal Problem**

Major problem encountered before recovery operations can be started is that of getting the material out of the storage tanks. During period of storage, contents turn into a solid cement-like sludge. Acid cannot be used to dissolve the solid material, since the acid would also attack the tank.

A modified fire hose nozzle provides the answer. Used to throw a powerful stream of

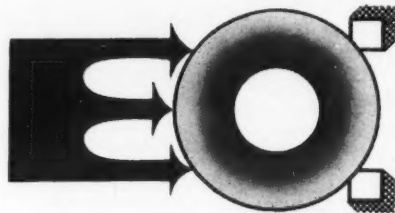
# Only **FLO-BALL** valves are "Bearing-Fixed" for maintenance-free long life!

**...with all the features you must have:**

- Top loading
- Replaceable seats
- One-piece ball and stem
- 90° on-off
- Two-way flow

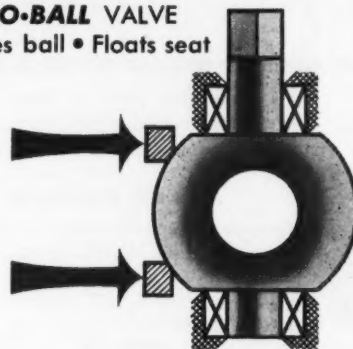


**ORDINARY BALL VALVE**  
Floats ball • Fixes seat



Floating ball puts excessive pressure load on fixed seats. Results in distortion and short life.

**FLO-BALL VALVE**  
Fixes ball • Floats seat



**FLO-BALL** bearings absorb all pressure forces. Elimination of excessive seat loading insures long life.

The **FLO-BALL** is competitively priced in all materials and sizes through 10" in 150 lb. and 300 lb. class. Write today to Hydromatics for full information on this extraordinary valve.

## Hydromatics, Inc.

LIVINGSTON, N. J. • WYMAN 2-4900 • TWX - LIVINGSTON, N. J. 120

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Exceptional engineering employment opportunities—write today!



Check 3393 opposite last page.



## WHATEVER THE BREATHING HAZARD



### Scott Sling-Pak Model 6000-B4A

When seconds count, reach for the Scott Sling-Pak. This model is the fastest piece of emergency equipment made. Ideal for fast, safe entrance into hazardous atmospheres. Cylinder holds enough pure breathing air for 15 minutes of hard work. Breathing protection at lowest cost.



### Scott Air-Pak Model 6000-A2MS

For dangerous jobs of longer duration. Safe, comfortable breathing protection for a minimum of 30 minutes at extreme exertion. Bureau of Mines Approval No. 1308.



### Scott Demand Respirators

Designed especially to provide breathing protection in atmospheres not immediately dangerous to life and from which the wearer can escape without breathing equipment. Cylinder models and plant air-supply models available. Bureau of Mines Approval No. 1924.

### Scottoramic Mask

Provides picture-window vision in all directions for greater safety.



### Missiles and Space Vehicles

Military and civilian installations throughout the world, handling exotic fuels and chemicals, are depending on Scott Protective Breathing Equipment to solve their respiratory problems.



## SCOTT AVIATION CORPORATION

343 ERIE STREET • LANCASTER, N. Y.

Canada: Safety Supply Co., Toronto — Branches in Principal Cities  
Export: Southern Oxygen Co., 230 West 57th Street, New York 19, N. Y.

Check 3394 opposite last page.

## NEW SOLUTIONS

water against the hard sludge, it causes the mass to break up into easy-to-handle, smaller particles. Periscopes, similar to those on submarines, are used to observe operations within tank.

Conventional sewage pumps remove liquid and suspended solids from tank. Product is transferred to an adjacent area where it is completely dissolved with acid. A photoelectric cell and light source, similar to those used as automatic door-openers, assist in this job.

Beam passed into tank becomes interrupted when contents turn murky. This occurs after a given quantity of acid has dissolved maximum amount of material. The device then sounds an alarm and more acid is added.

Dissolved product is passed through subsequent processing steps to extract the uranium. Final operation consists of heating the material at high temperature to change it into a yellow powder. This easy-to-handle product is then readily converted to metallic uranium.

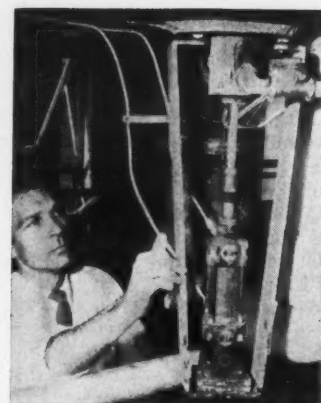
(Uranium recovery operations are being conducted at Hanford Atomic Products Operation, General Electric, Richland, Wash.)

### Piston-type valve assures clean yeast tank

Permits washing, steaming on discharge side

**Problem:** Discharge valve on bottom of 2500 gal yeast propagation tank was difficult to keep clean at Joseph E. Seagram & Sons, Inc., Louisville, Kentucky. The area within and around the conventional 3" gate valve could easily serve as a source of bacterial contamination. Rigid precautionary measures had to be observed to minimize this risk.

**Solution:** Company engineers designed and constructed (in their own shop) a sanitary, piston-type valve for the tank. Main component is a stainless steel piston, or plug, that fits

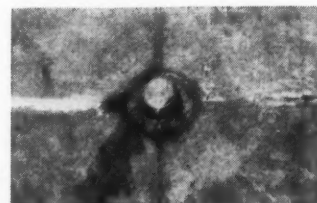


Photos by CP Staff

Air-operated valve shown attached to bottom of 2500 gal yeast tank. Device has worked out so well that five other tanks are being equipped with it. Valve was built in plant's own shop

flush into discharge opening of tank. When closed, top of plug forms tight, smooth surface with interior of tank.

Sides of piston are grooved to permit washing or steaming of both the valve and line on discharge side of tank without affecting yeast in tank. Steam and water lines are fastened to sides of valve for this purpose. The device is air-operated, requiring only 10-15 psi for actuations.



Top of valve as seen in tank. When closed, piston forms flush surface with interior of tank

**Results:** The valves has surpassed all advance expectations. Keeping the yeast tank, valve, and lines clean is now a relatively simple task. The valve has worked out so well that all six yeast tanks in the plant are being fitted with the device.

For more information on product at right, specify 3395... see information request blank opposite last page.

CHEMICAL PROCESSING

# U.S.I. CHEMICAL NEWS

★ A Series for Chemists and Executives of the Solvents and Chemical Consuming Industries ★

## U.S.I.-International Formed To Serve Markets for U.S.I. Polyethylene Abroad

A new European company has been formed by National Distillers (U.S.I.'s parent corporation) to handle the overseas sales of PETROTHENE® polyethylene resins, and to provide technical service and help in developing markets to customers for polyethylene. The new unit will be called U.S. Industrial Chemicals Co. — International, Division of Sales and Development Company of National Distillers and Chemical Corporation—(International) S.A. Temporary headquarters were opened in September at Kirchenstrasse 13, Zug 1, Switzerland. Permanent headquarters and laboratories will be constructed in Baar, Canton of Zug.

A customer service laboratory will be an integral part of the new company. It will be completely equipped with processing and test equipment designed to meet European standards and operating conditions. The laboratory will be used to demonstrate processing techniques and for research and evaluation studies to help its customers develop new end-use markets and produce improved products. The laboratory will also include polymer testing equipment to insure product quality. The laboratory will service markets in the European countries, including the United Kingdom. Mr. Howard W. Woodham is the Manager of the new Technical Service Laboratory.

Sales Manager of U.S.I.—International is Mr. Kenneth E. Cosslett, who has been U.S.I.'s Assistant Export Manager. According to Mr. Cosslett, U.S.I.—International's PETROTHENE resin sales will be made through established representatives in European countries. The new company will be a supporting unit to help these representatives provide the close technical assistance which the polyethylene market demands.



Woodham



Cosslett

## Ruthenocene and Osmocene Found to Have Aromatic Character, Like Ferrocene

Two more organometallic compounds are reported to behave like aromatics, although the compounds from which they are derived are completely nonaromatic. In this re-

**MORE**

## Methionine Stressed for Cosmetic and Pharmaceutical Use

New Developments Summarized and Current Applications  
Reviewed in Paper Given at TGA Meeting

At the December meeting of the Scientific section of the Toilet Goods Association in New York, Dr. Harry J. Prebluda of U.S.I. and Dr. Irwin Lubowe of the

New York Medical College spoke on the growing uses of methionine in drug and cosmetic formulations. Methionine is an essential amino acid containing sulfur.

Increased knowledge of methionine's reactions and functions in the living organism has stimulated a considerable amount of interest in the compound. Clinical studies following up on basic biochemical research have pointed to new uses for synthetic DL-methionine in pharmaceuticals and cosmetics. U.S.I. has been a pioneer in the development and use of synthetic DL-methionine by the animal feed and pharmaceutical industries.

### Topical Applications

Clinical trials have been conducted with methionine and its derivatives in the topical treatment of various cutaneous diseases with great success. Data on the rate and extent of methionine absorption through the skin indicates nearly half the efficiency of oral feeding. This means that some of the polyfunctional properties of methionine can be utilized by formulators of cosmetics, toiletries and topically applied medications. Commercial preparations containing DL-methionine along with other ingredients for topical use are presently appearing in this country and abroad. Aerosol sprays are also being explored.

A therapeutic compress containing methionine has been formulated which has proven very effective in the early treatment of infectious and eczematous dermatitis. There have been several favorable reports on the value of methionine for wound healing in protein depleted animals and humans.

**MORE**



World's largest zirconium ingot, 13,200 lbs., gets surface examination at Niles, Ohio, plant of Mallory-Sharon Metals Corporation (owned one-third by U.S.I.). Ingot was melted from zirconium chunklets produced by company's exclusive sodium reduction process. Melting of giant 30-inch ingot is regarded as significant achievement, since cost of strip and sheet products is directly affected by ingot size.

## Polyurethane Foam Now Used in Bone Surgery

According to recent reports, surgeons can now "glue" broken bones, permitting patients to move a fractured limb while it is healing. Polyurethane foam is the material used, and it has already been tested successfully in hundreds of cases of serious fracture demanding reduction by surgery.

The foam is prepared right at the operating table from sterilized prepolymer and activator, then poured into place by the surgeon. It hardens rapidly, and the patient can move the limb within a few hours. Patients have walked on broken legs so treated in two to seven days after surgery.

The polyurethane foam is quickly replaced by new bone which grows through and around it. No toxic reaction has been reported.

## New Data Sheet on Caustic Soda Just Issued by U.S.I.

Specifications, properties, applications and shipping information for caustic soda are detailed in a new data sheet now available from U.S.I.

The material, which U.S.I. ships as commercial grade 50% liquid in tankcars, tank trucks and barges from two plants at Huntsville, Alabama, is used primarily in the manufacture of chemicals, rayon and film, pulp and paper, petroleum derivatives, cleansers, textiles and soap.

The data sheet can be obtained from U.S.I. sales offices or from the Chlorine and Caustic Soda Sales Department, U.S. Industrial Chemicals Co., 99 Park Avenue, New York 16, N.Y.

# U.S.I. CHEMICAL NEWS

## CONTINUED

## Methionine

## Oral Use

Many cases of chronic peptic ulcer have been treated with methionine, with good clinical healing results in 80% of the patients. The addition of methionine to infant oral formulas is effective for clearing up cases of diaper rash. Similarly, methionine has been used orally for urine odor control with older patients in hospitals and other institutions. Methionine intake at high levels has been used in the treatment of stubborn urinary tract infections. Stable chemical reaction products from organic acids and methionine derivatives have been prepared which show clinical promise for a series of non-toxic wide-spectrum urinary antiseptics.

Methionine has been used in formulations for treating coronary artery disease in humans. The material also seems to protect biological systems against natural or nuclear radiation. More recently, methionine has been tried in the treatment of schizophrenia in a European psychiatric clinic with excellent results. American workers have already started to explore the possibilities of using methionine by itself or in combination with recognized tranquilizers for the treatment of mental disease and emotional depression brought about by impaired nitrogen metabolism.

The technical presentation before the TCA was documented with 48 references. Reprints can be obtained from U.S.I. on request.

## CONTINUED

## Organo-metallics

spect they are like ferrocene (dicyclopentadienyliron) which appears to have aromatic reactivity although it is derived from non-aromatic cyclopentadiene.

The materials are ruthenocene (dicyclopentadienylruthenium) and osmocene (dicyclopentadienylosmium), prepared from ruthenium trichloride and osmium tetrachloride plus cyclopentadienylsodium which is a reaction product of cyclopentadiene and metallic sodium. Both ruthenocene and osmocene undergo substitution reactions that are characteristically aromatic. They react with acyl chlorides in the presence of aluminum chloride in a way typical of aromatic Friedel-Crafts

reactions. They can be metalated with *n*-butyllithium to give (after carbonation and hydrolysis) mono- and dicarboxylic acids.

Because all of these metallocenes participate in the Friedel-Craft reaction, it has been possible to prepare novel compounds containing two different metals—ferrocenyl ruthenocenyl ketone, for example.

## New Polyethylene-Lined Drums Designed to Ship Liquid Chemicals

A new type of polyethylene-lined drum now available to the chemical industry has an outer pack which consists of wood members reinforced with double-dipped, galvanized steel binding wires and staples. This exterior is said to be corrosion-resistant, and to make the drums lighter, more durable and less expensive than the usual combinations of steel and polyethylene.

The drums have passed MCA-ICC tests for regulated liquids, and can now be used for any liquid safe in polyethylene. This includes corrosive, inflammable and toxic materials.

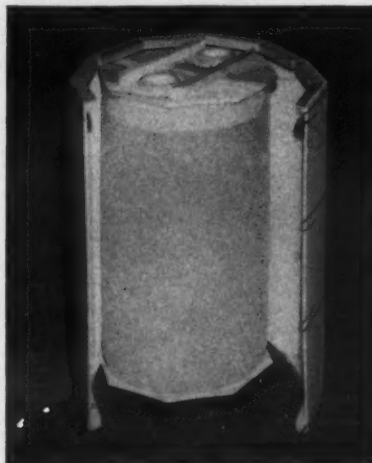


Photo courtesy Delaware Barrel & Drum Co.

## TECHNICAL DEVELOPMENTS

Information about manufacturers of these items may be obtained by writing U.S.I.

**Amino-acid resins**—a series of ion-exchange resins specially prepared for separation and analysis of amino acids—are now on market. Available in two types for use with fraction collectors or amino-acid analyzers. **No. 1550**

**Plastics safety handbook** now being sold is first such volume devoted entirely to safety ever to be published for plastics processing industry. Many industry processes are specifically treated, giving latest safety methods. **No. 1551**

**New portable hydrocarbon detector** gives rapid analysis of total organically bonded carbons in gases, with sensitivity better than 0.1 ppm. Can monitor air pollution or lower explosive limits, detect leaks or impurities in systems. **No. 1552**

**New catalog offers reprints of technical journals and books** long out of print but in great demand. Reprints are reproduced in book form by offset process, and are sold both paper-bound and cloth-bound. **No. 1553**

**Mobile vacuum system** can now be obtained which is claimed to produce any desired moderate vacuum (250 mm to 0.5 mm) and hold it within  $\pm 0.2$  mm, in an airtight system. Plugs into any 115-volt, 60-cycle, a-c outlet. **No. 1554**

**For painting and decorating polyethylene**, new flexible lacquer has been developed. Said to be durable, chip-proof; will not come off with handling. No special treatment of polyethylene needed to make lacquer adhere, it is claimed. **No. 1555**

**Measurement of chlorine-in-air** in concentrations from 1/2 to 20 ppm can now be accomplished with new field detector kit. Employs aspirator bulb to draw samples across detector tube of silica gel. Reaction yields blue stain on gel. **No. 1556**

**English translations of Crystallography**, a bi-monthly publication of the USSR Academy of Sciences, can now be purchased. Offers experimental and theoretical papers on crystal structure, growth, and other phases of the subject. **No. 1557**

**PTH (3-phenyl-thiohydantoin) derivatives of amino acids** being offered as tools in protein and peptide structure determinations. Used as standards and for comparisons when applying Edman method to study of protein structures. **No. 1558**

**New automatic recording vacuum balance** can weigh samples in air or inert gases, at atmospheric or reduced pressures, at room or higher temperatures, on balance pan or suspended below balance in a furnace. **No. 1559**

## PRODUCTS OF U.S.I.

**Alcohols:** Ethyl (pure and all denatured formulas); Anhydrous and Regular Proprietary Denatured Alcohol Solvents SOLOX®, FILMEX®, ANSOL®M, ANSOL FR.

**Organic Solvents and Intermediates:** Normal Butyl Alcohol, Amyl Alcohol, Fusel Oil, Ethyl Acetate, Normal Butyl Acetate, Diethyl Carbonate, DIATOL®, Diethyl Oxalate, Ethyl Ether, Acetone, Acetoacetanilide, Acetoacet-Ortho-Chloranilide, Acetoacet-Ortho-Toluidide, Ethyl Acetoacetate, Ethyl Benzoylacetate, Ethyl Chloroformate, Ethylene, Ethyl Sodium Oxalacetate, Sodium Ethylate, Urethan U.S.P. (Ethyl Carbamate), Riboflavin U.S.P.

**Pharmaceutical Products:** DL-Methionine, N-Acetyl-DL-Methionine, Urethan USP, Intermediates.

**Heavy Chemicals:** Anhydrous Ammonia, Ammonium Nitrate, Nitric Acid, Nitrogen Fertilizer Solutions, Phosphatic Fertilizer Solution, Sulfuric Acid, Caustic Soda, Chlorine, Metallic Sodium, Sodium Peroxide.

**PETROTHENE® . . . Polyethylene Resins**

**Animal Feed Products:** DL-Methionine, MOREA® Premix (to authorized mixer-distributors).



**INDUSTRIAL CHEMICALS CO.**

Division of National Distillers and Chemical Corporation  
99 Park Avenue, New York 16, N. Y.

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New Orleans • New York • Philadelphia • St. Louis • San Francisco



## PROCESS PIPING POINTERS

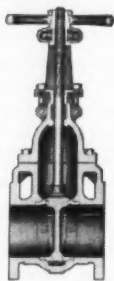
### Square corner lap makes stronger flanged pipe joint

Square corner lap in this pipe joint provides a much heavier metal section at the turn, or fillet, than the round type . . . assures a smooth joint on inside of the pipe. Lap is completely machined over . . . gives even bearing through joint for uniform gasket pressure. Flange swivels on pipe, facilitating alignment. Made of lap-welded steel or wrought iron pipe (in all weights), or seamless steel. Available in 150- to 1500-pound pressure classes. For more information, see below. Mention Cranelap joints.



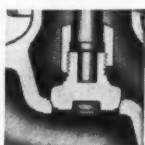
### Low-cost remedy for corrosion of iron valves

Where cast iron valves are practical but for corrosive and contaminating effects, 3% nickel alloy iron gate valves offer a low-cost remedy. These valves have the same strength but with substantially greater corrosion resistance. Priced slightly above ordinary iron, these valves in 2- to 18-inch sizes are attractive values for many chemical processing fluids. Companion swing checks available. Ask for Bulletin AD-2313—see below.



### Seats last longer in stainless steel globe valves

This improved swivel disc seating design prevents galling and seizing on the seating surfaces. The disc stops rotating on contact with seat, and stem takes over all closing torque. There's more you should know about these longer lasting, maintenance-saving valves. Ask for Bulletin AD-2411—see below.



For literature or data on products listed above, please contact  
**R. E. Catlett, Manager,**  
Chemical Sales Dept. No obligation.

## CRANE CO.

Gen'l Offices: 836 S. Michigan Ave., Chicago 5  
**VALVES • FITTINGS • PIPE**  
PLUMBING • HEATING • AIR CONDITIONING  
Branches and Wholesalers Everywhere

Check 3396 opposite last page.

FEBRUARY 1960



processing and engineering data

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# Screen Characteristics

B.B. KLIMA

Chemical Technology Division  
Oak Ridge National Laboratory

AND

D. S. DAVIS

Head, Department of Pulp and Paper Technology  
University of Alabama

When using screens, chemical engineers compute opening sizes and percentages of open area through use of the equations:

$$N(D+M) = 1000$$

$$\text{and } A = (1000 - ND)^2 \times 10^{-4}$$

where  $N$  = number of meshes per linear inch  
 $D$  = diameter of wire, thousandths of an inch

$M$  = mesh opening between wires, thousandths of an inch

$A$  = percentage of open area

Accompanying nomographs, constructed by means of well-known methods,<sup>1</sup> facilitate these computations.

## Typical Examples

Broken index line on Figure 1 shows that the mesh opening for 5-mesh screen is 0.156" when diameter of each wire is 0.044". Broken index line on Figure 2, for finer screens, shows that mesh opening for a 14-mesh screen is 0.0464" when diameter of each wire is 0.025".

Index line on Figure 3 shows that the percentage of open area for a 60-mesh screen is 34 when diameter of each wire is 0.007".

## LITERATURE CITED:

1) Davis, D. S., "Nomography and Empirical Equations," Chapters 5 and 6, Reinhold Publishing Corporation, New York (1955).

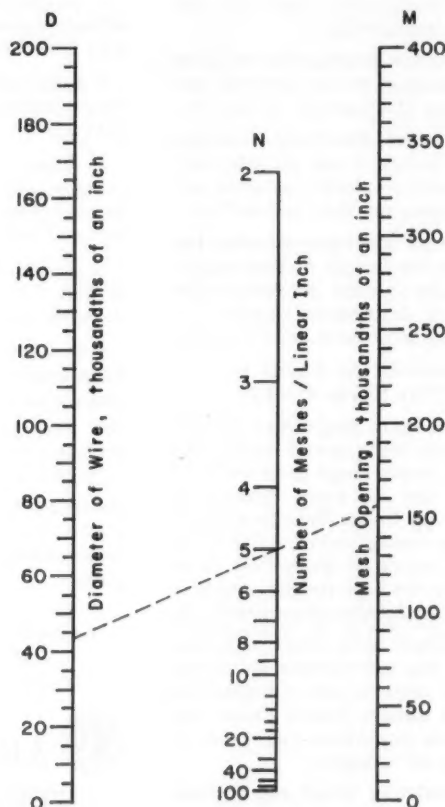


FIG. 1

(Figures 2 and 3 appear on pages 65 and 67)

# Maintenance and Steam Traps

... there's a relationship that goes far beyond trap maintenance alone

Good traps and good trapping have a greater effect on your maintenance costs than does trap maintenance itself. By that we mean that the right traps, properly selected and installed, and with the benefits of a preventive maintenance program, will save far more maintenance dollars than they will cost.

Under the pressure of spiralling maintenance costs, this thought becomes mighty important. Let's take a look at what it involves:

## Proper Selection of Steam Traps

1. Be sure it's the right type of trap.
2. Be sure it's sized right and is for the correct operating pressure.
3. Be sure it's first rate in design and construction.

## Proper Installation of Steam Traps

1. Install them so they are accessible for inspection and maintenance.
2. Install a test valve.
3. Use a union or unions.
4. Use a shutoff valve or valves.
5. Use a strainer ahead of the trap if dirt conditions are bad.
6. Use a by-pass only where continuity of service is imperative.
7. Standardize inlet and outlet connections.

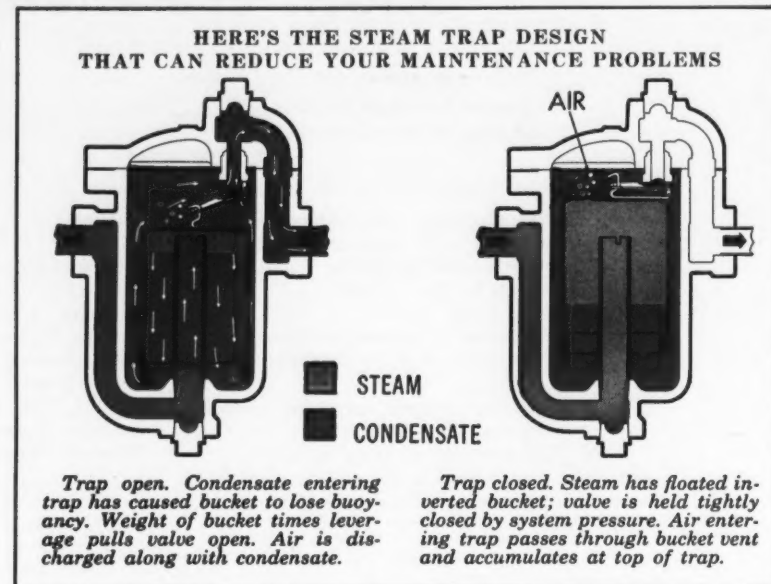
## Preventive Maintenance Program

1. Test trap regularly for proper operation. (Trap size, operating pressure and importance determine frequency.)
2. Inspect internal mechanism at least once a year.

## You Get Indirect Benefits As Well

The direct benefits of the plan outlined are pretty obvious—good traps, properly selected, require less maintenance... testing and inspection prevents troubles that lead to maintenance.

However, this plan provides indirect benefits which reduce maintenance in other parts of the plant as well:



burning equipment and on ash handling equipment.

**Good traps protect the system** by eliminating water hammer and preventing the damage it can do.

**Good traps discharge carbon dioxide** before it can go into solution to form corrosive carbonic acid—less corrosion, less maintenance.

**Good traps increase production** to reduce the length of time equipment must operate or reduce the amount of equipment needed... either way maintenance is reduced.

## How to Go About It (The Sales Pitch)

We admit we're prejudiced, but we don't think there is any better way to select steam traps than with the help of the 44 page Armstrong Steam Trap Book. Here in a single source is specific data on the selection and sizing of traps, how to install them for best results, and how to maintain them most economically.

The Steam Trap Book will also give you full information on the design and construction of Armstrong Inverted Bucket Steam Traps that offer these important maintenance-reducing advantages:

1. Armstrong Traps are dependable.

"See our catalog in Sweets' Plant Engineering File"

2. Armstrong Traps require no adjustments—go from full load to zero load automatically.

3. Armstrong Traps are self-scrubbing—ordinary dirt conditions can't hurt them.

4. Armstrong Traps have long-life parts—valve and seat are heat treated chrome steel—lever assembly and bucket are stainless steel.

5. Armstrong Traps have water sealed valves to minimize wire drawing and erosion.

Ask for your copy of the Steam Trap Book—there is no obligation. Then test Armstrong Trapping. If you are not completely satisfied with the results, you can return the traps for a full refund of the purchase price. You can't lose much that way. Call your local Armstrong Representative or Distributor, or write

Armstrong Machine Works  
8802 Maple Street  
Three Rivers, Michigan



**ARMSTRONG  
STEAM TRAPS**

## NEW SOLUTIONS

### Inorganic zinc coating protects large rig from salt

**Problem:** Large unit to be used for digging salt had to be protected from corrosion from this material. Severe wind abrasion was also a problem.

Salt harvester, believed to be world's largest unit of this type, will dig 1000 tons of salt per hour at the evaporative flats near Black Warrior Lagoon in Baja, California.

**Solution:** Rig was sprayed with an inorganic zinc coating known as Dimetecote No. 3. Only a single 3-mil coat was necessary.

Coating is composed of two materials, a reactive liquid and a finely divided powder, which are mixed together before application. Liquid mixture reacts in place with the steel surface to form an insoluble zinc silicate coating.

**Results:** Excellent adhesion, resistance to abrasion, salt and atmospheric corrosion of coating are expected to enable it to provide protection to rig under the adverse conditions.

(Dimetecote No. 3 is product of Amercoat Corporation, 4809 Firestone Boulevard, South Gate, California.)

Check 3398 opposite last page.

## WANTED: NOMOGRAPHS — WORTH \$20 EACH!

Do you have a pet nomograph that could save time for other **CHEMICAL PROCESSING** readers? If so, send it neatly and accurately drawn, with a double spaced, type-written description to:

Data Editor

**CHEMICAL PROCESSING**  
111 E. Delaware Place  
Chicago 11, Illinois

We will pay \$20 for each one accepted and published.



## Screen Characteristics

From page 63

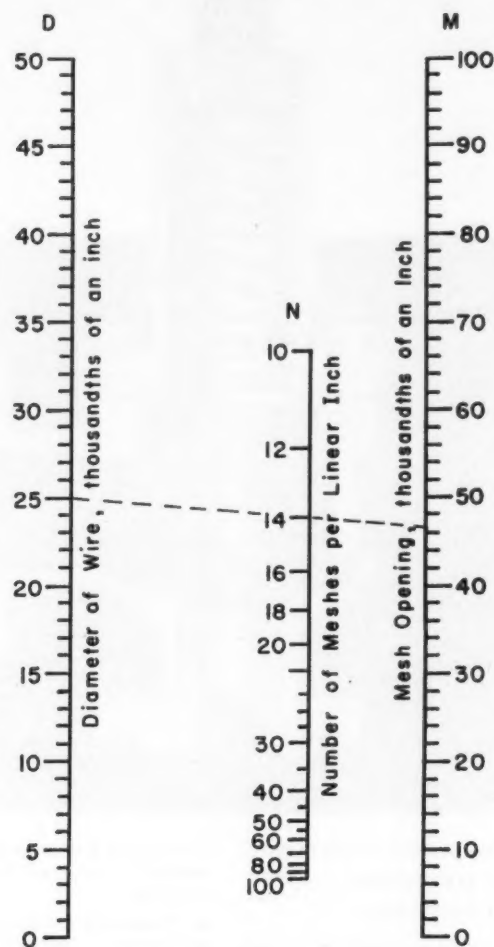
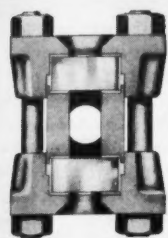


Fig. 2

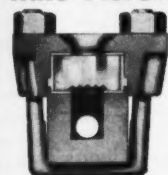
Figure 3 on page 67

## HIGH PRESSURE GAUGES

USED IN  
REFINERIES  
AND  
CHEMICAL PLANTS  
THROUGHOUT  
THE WORLD



THRU VISION



REFLEX

Single or Multiple  
Sections

### TUBULAR

Gauge Cocks

Large Chamber  
Reflex Gauges

Heated or Cooled  
Gauges

SEND FOR  
COMPLETE  
CATALOGUE

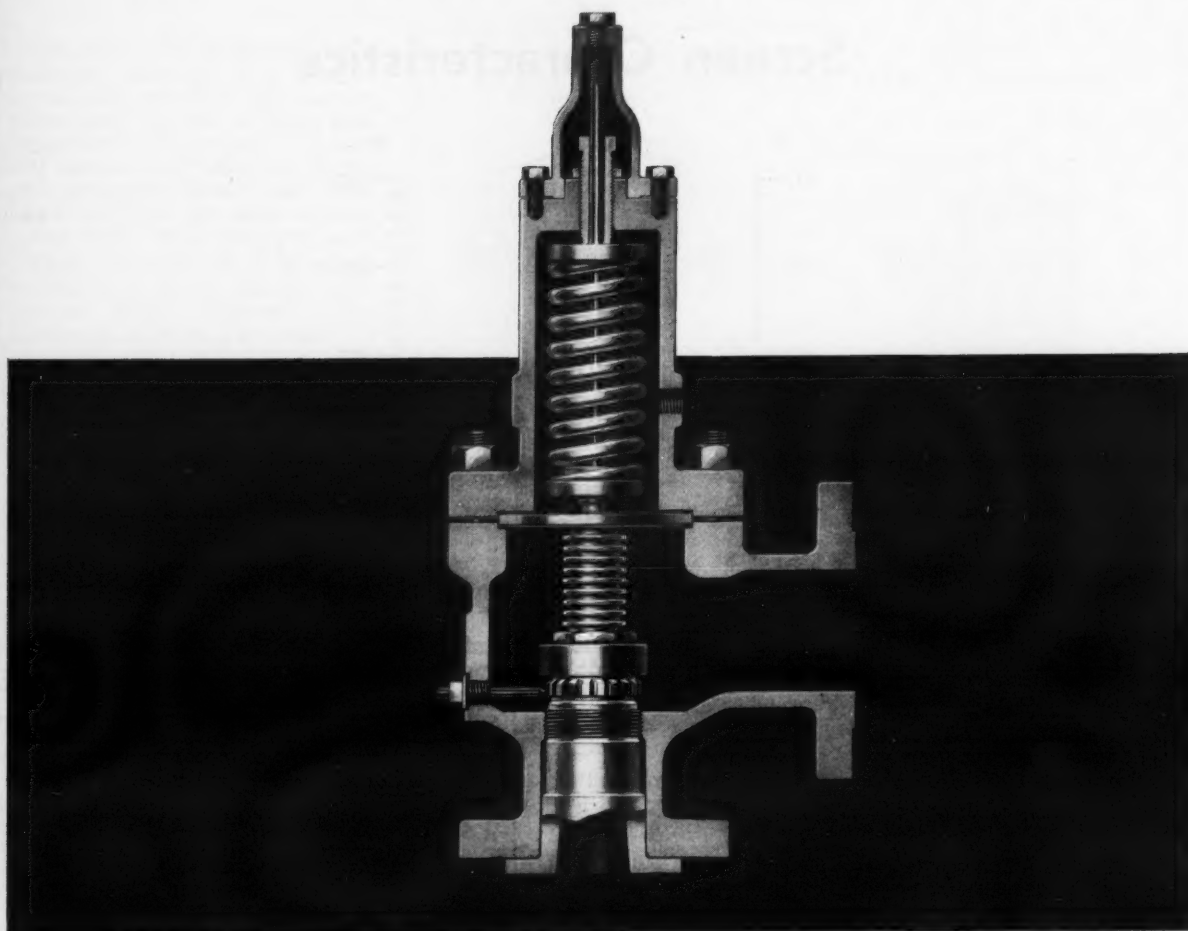
STRAHMAN VALVES, Inc.  
NICOLET AVE., FLORHAM PARK, N. J.

Check 3399 opposite last page.

FEBRUARY 1960



## Look into Lonerger Bellows Valves



**Seven exclusive features reduce maintenance costs; provide increased valve versatility.**

Like all bellows valves, Lonergan valves are designed to keep corrosive or viscous fluids away from working parts. In addition, they provide a balancing action against a variable back pressure. The similarity between Lonergan and any other bellows valve ends there. *Only Lonergan valves provide:*



1. **\*Saf-T-Alarm** to warn of bellows failure. Alarm may be remotely located. (Optional at extra cost.)
2. **Complete interchangeability** with conventional valves of the same series.
3. **Versatile cap arrangement.** Bolted cap

is standard and is interchangeable with a packed cap without taking the valve off the line or out of service. Gag facility is included.

4. **\*Simplified nozzle replacement** due to an exclusive knock-out feature. (Optional.)
5. **A Hydro model; a patented, true, non-chattering liquid valve.** Elimination of chatter ends bellows failure due to excessive flexing.
6. **Reserve seating surface** obtained from a built-in spare disc.
7. **PVC trim,** where pressure-temperature conditions permit.

These seven features mean economy for Lonergan valve users—in first cost; in operation; in maintenance. If your plant uses bellows valves, then it will pay you to investigate Lonergan. Series DB bellows valves are described in a new bulletin. Series D valves, available without the bellows, are also described. Write for your copy today.

*\*Patent Pending*

## Lonerger

J. E. LONERGAN CO. • 203 RACE STREET • PHILADELPHIA, PA. • SINCE 1872



Check 3400 opposite last page.

## NEW SOLUTIONS

### **Mill boosts quality, assures fine grinding of insecticides**

**Reduces particle size down  
to five microns**

More uniform, higher quality insecticides and fungicides are being produced through the use of an efficient impact mill at Quality Chemical Corp., Wilson, North Carolina. Approximately one ton an hour is being processed, including DDT, aldrin, TDE, dieldrin, endrin, B.H.C., and chlordane.

The 24" diam vertical-type unit has been operating for over a year, almost daily on an eight hour basis. Average feed is reduced to approximately five microns.

Pulverization of product is important to assure proper dispersion of finished insecticide over as much of a plant leaf as possible. To do this effectively, fines must be in low micron range. With the mill, size of particles can be regulated by adjusting number of selector bars at top of mill housing.

Quality uses from 6 to 12 bars on various products. Vanes create whirling vertical air flow which pulls ingredients into pulverizing zone where revolving impactors crash them against stationary wall impactors. This double action, combined with attrition of particles against housing walls, performs pulverization.

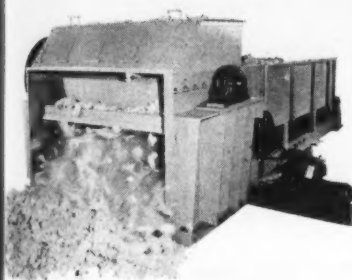
Deflector wall construction assures return of oversize particles to grinding zone while whirlwind exhaust fan sucks other fines upward through revolving centrifugal selector arms. These also guard against oversize and permit only particles of desired fineness to be blown to dust collector.

Whirling flow of air has cooling effect on material being ground, permitting processing of some heat-sensitive materials. Refrigerated air may also be used, if necessary.

(Pulver-mill is product of Sturtevant Mill Company, Boston, Mass.)

Check 3401 opposite last page.

*Taylor-Stiles*  
bale breakers  
reduce  
your  
bale opening  
costs



It will pay you to compare the costs of opening bales by your present methods and opening them with a Taylor-Stiles Bale Breaker.

Taylor-Stiles machines open bales of such materials as bagasse, Jute cuttings, rags, cotton linters, and cork, asbestos, excelsior, and straw in seconds where other methods take minutes. They eliminate the hazards to workers of manual opening.

You will find Taylor-Stiles Bale Openers will help you effect attractive savings in your opening operations. Operation is simple. Place bale on feed. Cut fastenings and automatically the machines feeds and opens the bales.

Leading manufacturers all over the world are using these machines.

Why continue to use expensive hazardous hand methods of Bale Opening?

Write today for 4 pg. Technical Bulletin 215 with specifications and full details of Taylor-Stiles Bale Openers.

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Check 3402 opposite last page.

FEBRUARY 1960



processing and engineering data

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## Screen Characteristics

From page 65

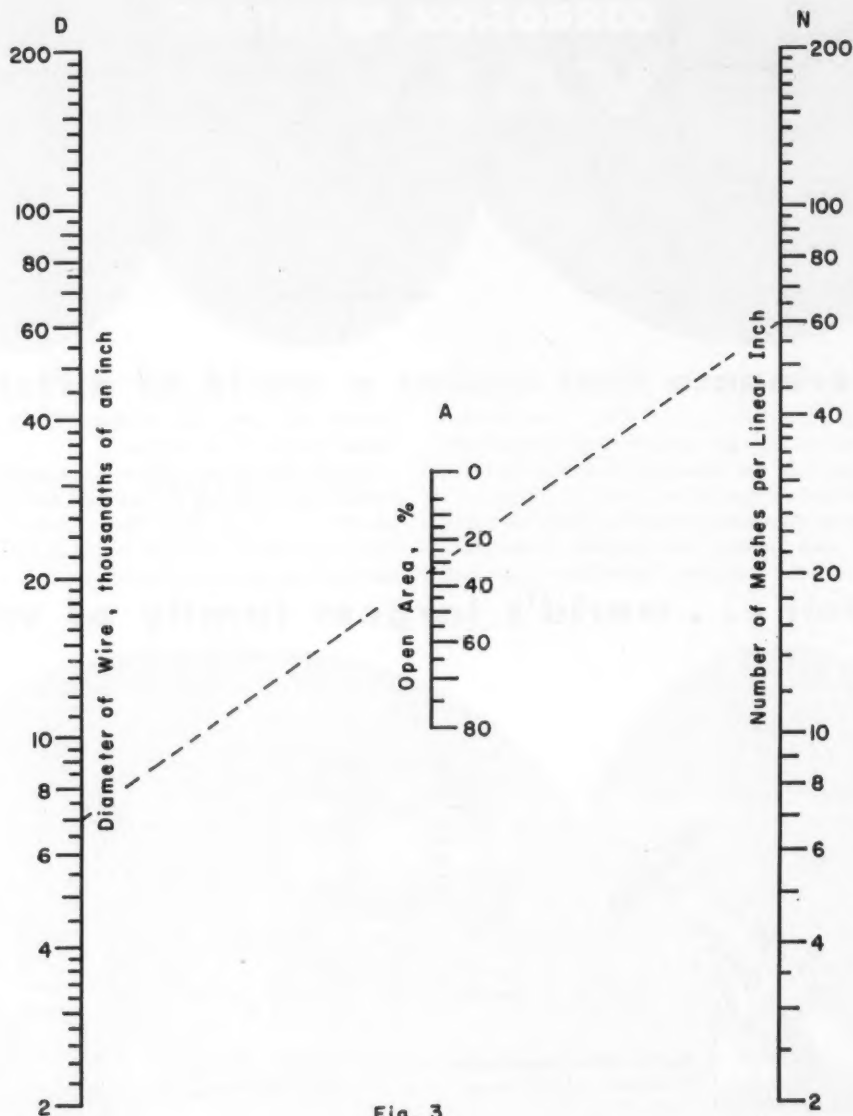


Fig. 3

## CORROSION RESISTANT VALVES

### performance that makes a world of difference

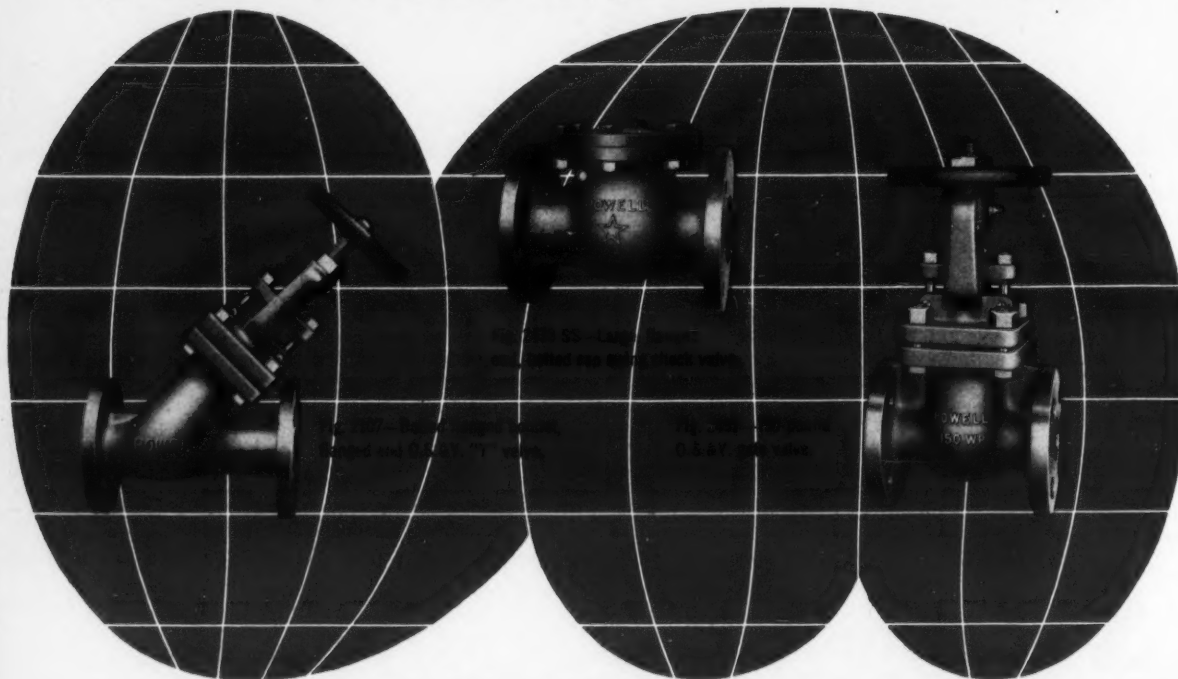
The Powell Special Design and Alloy Valve Division was created to study and solve the flow control problems arising from the increasing number of corrosive fluids used in the Chemical and Process industries.

As a result, Powell has developed valves that can be depended upon for long, uninterrupted service under the most corrosive conditions; valves that require little

maintenance; and that eliminate the possibility of contamination of end product.

Powell offers valves to handle practically every corrosive fluid—valves of every design and in the largest selection of metals and alloys. Contact your local Powell distributor. Or write or call us direct. Our consulting engineers are at your service.

### Powell . . . world's largest family of valves



THE WM. POWELL COMPANY • DEPENDABLE VALVES SINCE 1846 • CINCINNATI 22, OHIO

Check 3403 opposite last page.

#### NEW LITERATURE

New Solutions  
of Processing Problems

**Polyester molding compound** and how it filled need for low-cost filter plate is reviewed in four-page case-history style bulletin. Chart comparing cost, weight, and properties of conventional materials used in construction of filter plates is also included. "Plastic Displaces Metal" — Chemicals Division, Atlas Powder Co.

Check 3404 opposite last page.

**Spray dryer's role** in production, pilot plant, and laboratory at American Cyanamid Company is covered in four-page reprint. Spray Dryer Reprint — Bowen Engineering, Inc.

Check 3405 opposite last page.

**How sewage plant effluent** can be used satisfactorily in recirculating cooling systems and as boiler makeup is discussed in 16-page report. Tech Paper 138 — Betz Laboratories, Inc.

Check 3406 opposite last page.

**Case histories** of how ball valves are being used in the pulp and paper industry are covered in illustrated four-page brochure. Detailed descriptions of the valves are also given. Ball Valves Brochure — Jamesbury Corp.

Check 3407 opposite last page.

**Scale-up for solids processing** is subject of technical reprint. Included are series of case studies telling why scaling-up of solids processing equipment is different and difficult. Bul I-64 — Sprout, Waldron & Company, Inc.

Check 3408 opposite last page.

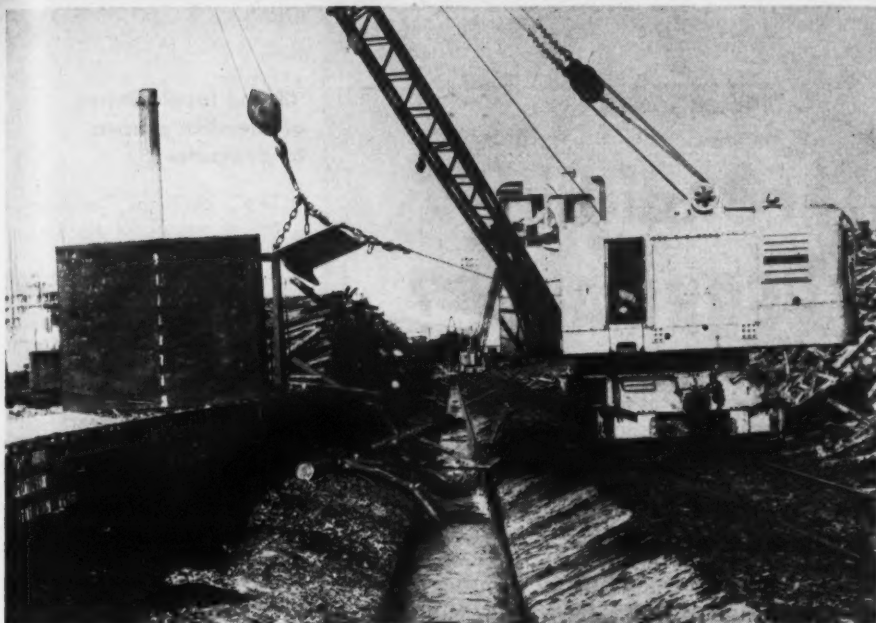
**Case histories** describing successful clarification of high color-low turbidity waters is discussed in eight-page technical reprint. Tables, curves, flow diagrams, and illustrations are included. Reprint T-176 — Graver Water Conditioning Co., division of Union Tank Car Company.

Check 3409 opposite last page.

#### NEXT MONTH

How a tough processing problem at Sherwin-Williams aided in the development of a highly efficient synthetic filter cartridge is disclosed in the March New Solutions section.





**IDEAS:** from other industries and nuclear field  
— new trends in research, process, services

Logs raked from railway car tumble onto flume apron, bounce into water, and float into mill. Rugged emery-containing surfacing material protects concrete base of apron from shock of plummeting logs

## Tough Beatings Don't Affect Flume Aprons

**Absorb punishment from 1000 cords of logs per day at Rayonier's chemical cellulose plant**

**Problem:** An extremely tough, durable surfacing material was needed to protect log unloading aprons at the Jesup, Georgia, chemical cellulose pulp plant of Rayonier, Inc. Logs 5 feet, 3 inches in length arrive by rail and truck and are roughly dumped onto the aprons of two 1000 feet-long flumes that carry them swiftly into the mill. Wood is consumed at rate of 1000 cords a day.

Conventional concrete aprons were considered, but it was felt that they would not be strong enough to absorb vigorous pounding of the logs.

The plant uses the sulfate process to convert both soft and hardwood into chemical cellulose pulp. The processing building is a modern, multiple-story, steel and concrete structure. It is well suited to rapid, continuous, efficient produc-

tion within rigid quality specifications.

**Solution:** An evaluation of surfacing materials indicated that a commercially available mixture containing emery aggregate would serve the purpose. Known as Emery-Crete, product has the ability to withstand severe mechanical shock, abrasion, and erosion. It is non-porous, water-resistant, and unaffected by many acids, alkalis, greases, and oils. In addition, it forms a non-slip surface.

Product is made from Portland Emery Aggregate (an emery ore mined in mid-New York State), cement, and water. Emery, a form of corundum, is carefully sized, shaped, graded, and proportioned to obtain optimum properties in the finished product.

Ingredients were mixed in ratio of two 100 lb bags of

emery aggregate to one bag of Portland cement, and not more than  $3\frac{1}{2}$  gal water. As soon as base course had taken initial set, and before it hardened, the mix was spread to depth about  $\frac{1}{2}$  inch above finish grade. It was then raked, tamped, and scraped down to one inch thick, finish grade.

### Critical Area Reinforced

Most critical area of flume is angle formed by the inclined plane of apron and the vertical wall of the flume channel. During construction, a form was shored up against the vertical wall by a spreader (see sketch) and the mix poured into the recess thus formed. A 6 x 6 mesh was used for reinforcement. Finally the edge proper was bevelled.

In order to provide a uni-

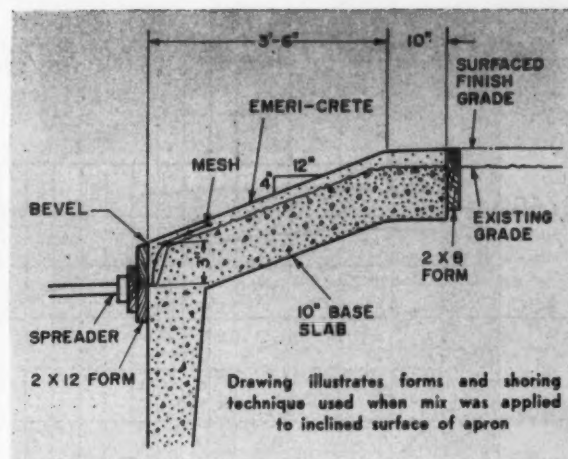
form, continuous, water-impermeable film, entire apron was sealed with liquid curing agent.

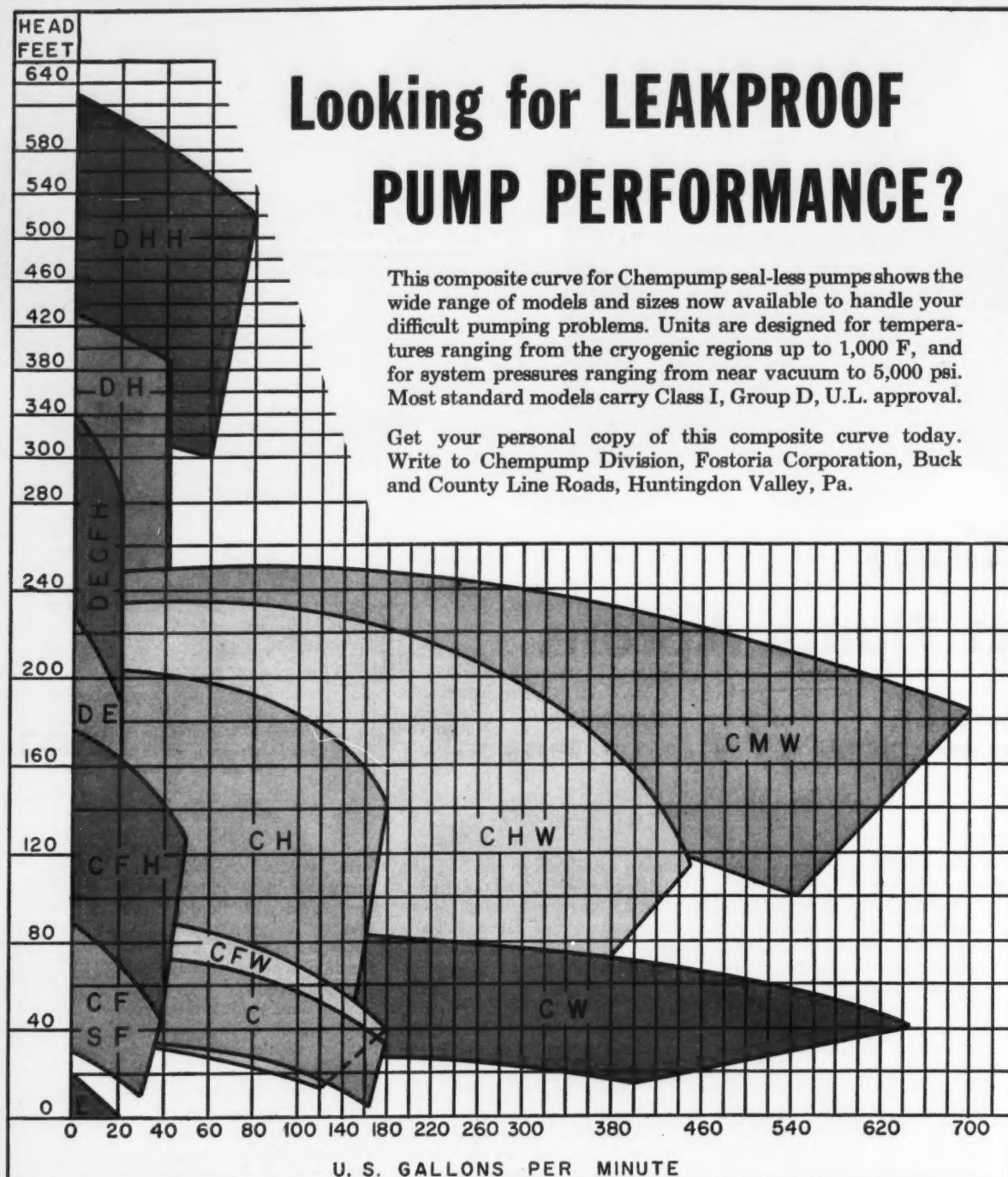
**Results:** The first flume was put into service in May 1954. The job required use of 675 cu ft of emery mix and covered 8100 sq ft of surface. It worked out so well that, when the second flume was required three years later, same materials were specified.

Each flume handles about 500 cords of wood daily. Condition of both flumes today is excellent, except in some spots (about 1% of total area) where foundation gave way under the surfacing material.

(Further information about Emery-Crete may be obtained from Walter Maguire Company, Inc., 60A E. 42nd Street, New York, New York.)

Check 3410 opposite last page.





# Looking for LEAKPROOF PUMP PERFORMANCE?

This composite curve for Chempump seal-less pumps shows the wide range of models and sizes now available to handle your difficult pumping problems. Units are designed for temperatures ranging from the cryogenic regions up to 1,000 F, and for system pressures ranging from near vacuum to 5,000 psi. Most standard models carry Class I, Group D, U.L. approval.

Get your personal copy of this composite curve today. Write to Chempump Division, Fostoria Corporation, Buck and County Line Roads, Huntingdon Valley, Pa.

This composite curve is intended to show relative head-capacity performance of Chempump seal-less pumps. It is to be used as a guide to specific model performance curves, available on request. All units are single stage except those with "D" in model designation which are two-stage pumps. Curves are based on 60-cycle operation.

## COMPOSITE CURVE

**C H E M P U M P**

DIVISION • FOSTORIA CORPORATION  
HUNTINGDON VALLEY, PENNSYLVANIA

## IDEAS

### 'Closed loop' control of chemical process by computer

Two chemical companies  
tell of successful startup

Two chemical companies "closed the loop" in computer control of a chemical process, in a virtual dead heat last month.

**B. F. Goodrich Chemical Company** disclosed that the digital computer system announced in January of 1959 is now in operation at Calvert City, Kentucky. Unit is exercising "closed loop" control on process for producing vinyl chloride monomer by cracking ethylene dichloride.

Computer, an RW-300 system engineered and manufactured by Thompson-Ramo-Wooldridge Products Company, is now well into its shake-down period with initial results in some areas exceeding expectations.

**Monsanto Chemical Company**, also utilizing an RW-300 digital control computer, has announced that on-line control of process for manufacture of ammonia is well into its testing period. Performance so far is reported as up to expectations.

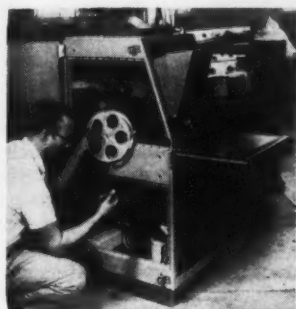
Both companies expect experience gained in these initial installations to be of considerable help in evaluating possibility of computer control for even more complicated production operations.



"Ready?"

Check 3411 opposite last page.

Teaching material is stored on 35 mm film. Reel holds up to 10,000 frames. Still or motion pictures may be freely intermixed



Teaching machine adapts itself completely to student's pace. It corrects him when wrong, congratulates him when right, and keeps detailed record of progress

Designed for today's complex industrial and military training programs, automated teaching machine . . .

- *Speeds Learning Process*
- *Saves Training Time*

Can a teacher be replaced by a machine? Probably not in his creative functions, but certainly in much of his routine work. Recognizing the need for such an apparatus in today's complex industrial and military training programs, an automated "teaching machine" has been developed that is reported to give a top level of education with at least 20 percent saving in training time.

The device is capable of adapting itself completely to the student's pace. It corrects him when wrong, congratulates him when right, and moves him on to the next subject when he has demonstrated thorough understanding of a given point. The machine also keeps a detailed record of the student's progress.

Basic components of the device are a film bank, automatic sequence and projection apparatus, selector buttons, viewing screen, and a tape printing machine.

The instructor who prepares the training program can use any material that can be presented on film — including color and motion picture film.

The machine performs a prodigious number of functions. The student begins by entering Number 1 on the keyboard, and the image Number 1 appears on the

screen. The image contains the first unit of information on the given subject, plus a multiple-choice question based on that information.

#### Pick A Number

Each alternative answer to the question has a new image number before it. The student selects one, enters it on the keyboard, and sees the new image. If answer is wrong, the image tells him so, explains why, supplies him with additional material to correct the error, and tells him how to proceed to find the right answer.

If student selects the right answer, the device congratulates him, supplies him with the next unit of information and the next multiple-choice question. Machine records progress of each student by keeping a step-by-step history of the sequence of images viewed and time spent viewing each.

Because there is two-way communication between student and machine, students can be given material of sufficient difficulty to present a real challenge. Each student proceeds at his own best rate. The last learner is not penalized . . .

To page 73

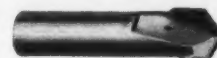
## KNOCK OUT SCALE WITH SUPER-POWERED WILSON TUBE CLEANERS

Are your heat exchanger tubes completely fouled with scale buildup? Or, are you looking for that last vital inch of heat transfer efficiency? In either case, efficient, hard-working Wilson Tube Cleaners are the answer.



For heavy duty service, for example, use Wilson air driven Model TP 301 shown above. This super-powerful, 15 lb, light weight, scavenger-type tube cleaner drills and simultaneously flushes out deposits. It is suitable for vertical or horizontal use in straight tubes  $\frac{3}{8}$ " ID to  $2\frac{7}{8}$ " ID and up to 40' long. Cleans rapidly and thoroughly, operating at high speed at 90 psi. Can run on pressure as low as 50 psi. Other Wilson Cleaners are available for every tube size.

#### WILSON SUPER-DUTY CARBIDE BITS



**TYPE M BIT**  
An inserted two-lip Helix type for general use.  $1\frac{1}{2}$ " to  $1\frac{1}{2}$ " bit OD.



**TYPE K BIT**  
A two-lip Helix type with adaptor for general use.  $1\frac{1}{4}$ " to  $2\frac{3}{4}$ " bit OD.



**TUBE EXPANDERS**—Wilson Models 41 and 44 Self-Feeding Tube Expanders are modern tube expanders for the precision rolling of condenser and heat exchanger tubes into heavy tube sheets. Ball Bearing Collar Type  $\frac{1}{2}$ " OD to  $2\frac{1}{2}$ " OD • Write for your free copy of Wilson Catalog 77-88. It's a mine of information on tube cleaning and tube expanding problems.

Representatives in principal cities  
**THOMAS C. WILSON, INC.**  
21-11 44th Ave., Long Island City 1, N.Y.  
Cable Address: "Tubeclean," New York



**WILSON**  
BETTER TOOLS FOR BETTER WORK

Check 3412 opposite last page.



COPPUS

BLUE RIBBON PRODUCTS



Coppus Horizontal Steam Turbine

**NEW RUGGED DESIGN—BLUE RIBBON RELIABILITY!**

Here's a new dimension in turbine performance! Coppus brings you a new rugged stability of design . . . a new measure of reliability in a complete range of power-packed turbines, from 1 HP to 250 HP—marked with the Blue Ribbon only after each is precision made . . . precision tested. Performance features like these assure you Blue Ribbon Reliability —

A totally enclosed governor . . . totally enclosed, independently operated safety trip . . . easily replaceable packing and bearings . . . multiple steam nozzle control . . . brake rim for added safety . . . wide bucket "L" type wheel (optional) for minimum water rate.

Coppus Turbines are built to customers' specifications, including API and NEMA standards. All Coppus Products carry the same Blue Ribbon assurance of reliable performance. For further facts on turbines, send for new Catalog 200. COPPUS ENGINEERING CORPORATION, 382 Park Avenue, Worcester, Mass. Sales Offices in *Thomas' Register*.

**COPPUS**  
STEAM TURBINES

**WHAT DO YOU THINK?**

Opinions and comments on the significant subjects carried in each month's **CHEMICAL PROCESSING** are important! We welcome your letters expressing your views. Many CP readers are taking the opportunity to state their views on today's top questions.

By publishing your letters in **CHEMICAL PROCESSING**, others will have the opportunity to hear your side.

**Perhaps you agree**

with what has been written in these articles.

**Maybe you don't.**

You might even have a thought or angle which wasn't expressed.

If so, why not let us and others hear your ideas? Suitable letters will be published in our regular "Letters from Readers" column. (See page 10.)

Address your comments to:  
The Editor  
**CHEMICAL PROCESSING**

111 E. Delaware Place, Chicago 11, Illinois

For more information on product at left, specify 3413 see information request blank opposite last page.



## Teaching Machine

From page 71

the slow learner proceeds at his own pace . . . both gain exactly the same knowledge.

Student's performance is monitored continuously, and any errors can be corrected by a whole image of correction material if necessary. Instructor need not merely try to condition the student to emit appropriate responses to selected stimuli. He can use any technique of communication known to educators.

All material, microfilmed or motion picture, is handled on 35 mm motion picture film. The reel holds up to 10,000 microfilmed or motion picture frames, any one of which may be selected by number from selector keyboard. Images are presented on a 8.2 x 11.2" projection screen.

The search control unit is bi-directional; it searches forward or backward from any given position without resetting. Sequence of images viewed and time spent viewing each are recorded numerically on tape. Time is recorded cumulatively.

Machines range in price from \$200 to \$12,000. Units may also be obtained on a lease basis. Both standard and special courses of instruction are available.

The manufacturer emphasizes that the teaching machine is not designed or intended to fill the role of the creative teacher. The job of a teacher is to develop concepts, enlarge the horizons of the student, and to motivate learning. It is hoped that the machine will help free the teacher for his real, creative role.

(Western Design Tutor was developed by USI Western Design, Division of U. S. Industries, Inc., Santa Barbara Division, Santa Barbara, Cal.)

Check 3414 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

At Tom Huston Peanut Co., Columbus, Georgia . . .

# Permaglas<sup>®</sup> Mechanized Bulk Storage Units

## Save \$21,000 per year

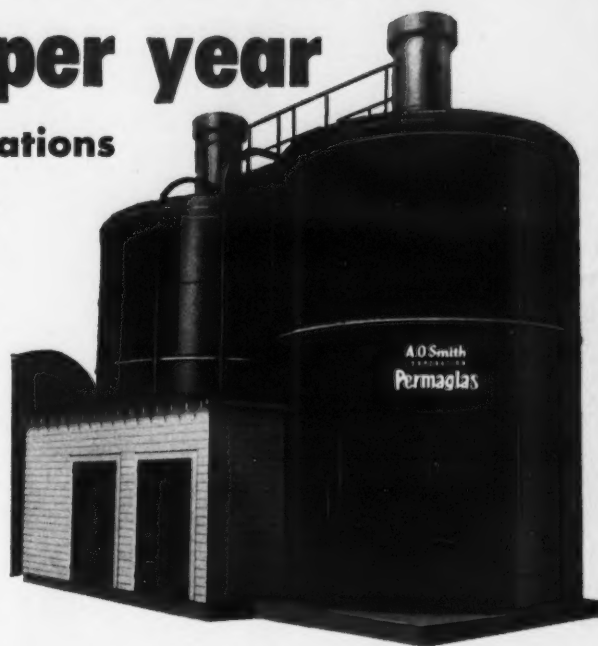
with inplant handling operations

- 77% less space required than for storage of bagged sugar

Two 17' x 20' Permaglas Bulk Storage Units, equipped with A. O. Smith's exclusive mechanical "sweep-arm" bottom unloader, and an automatic conveying system has replaced the out-dated, expensive method used for handling and storing sugar at the Tom Huston Peanut Company's plant in Columbus, Georgia. The automatic system conveys the bulk sugar efficiently, rapidly and directly into production processing. Here are the cost-saving advantages realized with the Permaglas Units:

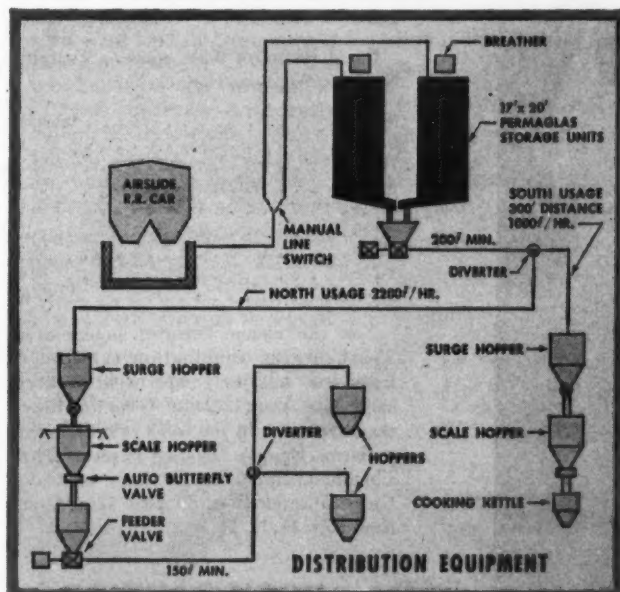
1. Elimination of inplant handling and storing of bagged sugar, resulting in savings of \$21,000 per year.

2. Sugar stored in bags required 3,320 sq. ft. of space. With bulk sugar storage only 760 sq. ft. of this space is necessary. Additional cost saved



ings realized are: more accurate weighing of sugar into premelt kettles . . . utmost sanitation in automatic system because sugar is not exposed to air until it is deposited into cooking kettles . . . no messy bags to contend with . . . safe, clean, sanitary storage of bulk sugar in the Permaglas Units rather than in the warehouse. Moreover, because Permaglas Structures are glass-lined inside and out—sugar is protected from contamination.

For complete details on Permaglas Mechanized Bulk Storage Units fill in and mail coupon.



Bulk sugar is pneumatically transported from "air-slide" railroad cars into two 17' x 20' Permaglas Mechanized Storage Units at the rate of 30,000 lbs. per hour. From the storage tanks the sugar is automatically fed into two sets of surge hoppers. From here the bulk sugar goes directly into cooking kettles for processing. This automatic distribution system is the answer to high-cost inplant handling and storing of bulk sugar.

Through research  . . . a better way

# A.O. Smith

CORPORATION

HARVESTORE PRODUCTS  
KANKAKEE, ILLINOIS  
A. O. Smith International S.A., Milwaukee 1, Wis.

A. O. SMITH CORPORATION  
Permaglas Storage Units, Dept. CP-20  
Kankakee, Illinois

Send me free Permaglas Mechanized Storage Unit Bulletin MU-100.

Name.....  
Title.....  
Company.....  
Address.....  
City.....Zone.....State.....

Check 3415 opposite last page.



# Fill your surfactant needs

## from CARBIDE'S 9 TERGITOL nonionics

Take your choice from CARBIDE'S TERGITOL nonionics—one that is completely soluble in oil . . . another that dissolves in water at high temperatures . . . or one with a combination of characteristics. TERGITOL nonionics have outstanding capacity to emulsify oils, waxes, and greasy soils—to hold them in suspension. As wetting agents, TERGITOL nonionics are noted for their chemical stability in the presence of acids and salts. They are not affected by hard water or alkalies.

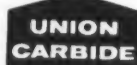
TERGITOL nonionics have proved effective in scouring, bleaching, and carbonizing compounds used by the textile industry. As detergents, they speed dishwashing, laundering, dry cleaning. They give good pigment dispersion, flow-out, and stability to latex paints. Metal cleaners, leather dressings, silicone preparations, shampoos, adhesives, bactericides—all can be improved with TERGITOL nonionics.

Cloud Points of 0.5% aqueous TERGITOL Nonionic Solutions (Degrees C.)

NP-14 . . . . .	Insoluble
NP-27 . . . . .	20
TP-9 . . . . .	51-56
NPX . . . . .	60-65
NP-35 . . . . .	90-95
NP-40 . . . . .	100
TMN . . . . .	35-37
XD . . . . .	60-65
XH . . . . .	90-100

You can obtain TERGITOL nonionics in 55-gal. drums, combination car load or truck load lots, or compartment tank car shipments. Your CARBIDE Technical Representative can help you solve your surfactant problems. Or write Dept. HC, Union Carbide Chemicals Company, Division of Union Carbide Corporation, 30 East 42nd Street, New York 17, N. Y.

**UNION CARBIDE  
CHEMICALS COMPANY**



"Tergitol" and "Union Carbide" are registered trade marks of UCC.

**THAT'S  
INTERESTING**

### ***It's the most***

A two-ton tire, 10 ft high and four ft wide, contains enough rubber to make 3200 passenger car tires. It is a research model, and was built by the Goodyear Tire & Rubber Company.

### ***Puff harder for less tar***

Velocity of air past cigarettes effects tar and nicotine delivery, a study made by United States Testing Co. contends. Higher velocities cut tar and nicotine delivery.

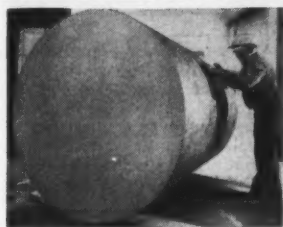
### ***Gas tax near 50%***

Depending on where you live, from 29.9 to 55.3c of each dollar you pay for gasoline is taken by state and U.S. taxes, according to Oil Facts, bulletin of American Petroleum Institute. Taxes range from 7c per gallon in Missouri to 11c in 13 states.

For more information on product at left, specify 3420 see information request blank opposite last page.







**Seven tons of graphite . .**

. . . make this one of the biggest graphite cylinders ever produced. Measuring 61" diam and 72" long, the cylinder will be cored to make sections for a large graphite tower in which elemental phosphorus will be burned to produce phosphoric acid. The cylinder is one of five produced.

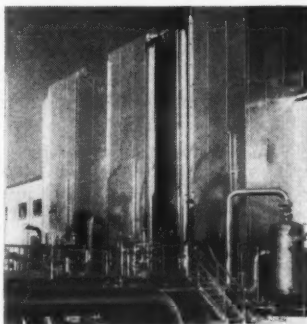
(Graphite cylinders were produced by National Carbon Company, Division of Union Carbide Corporation, New York, N. Y.)

Check 3417 opp. last page.

**Only 9 months needed to place helium plant on stream**

Processes 70 million cu ft of natural gas daily

Recently completed helium extraction plant at Keyes, Oklahoma, has doubled the U. S. capacity. Put on stream in less than 9 months, plant processes about 70 million cu ft natural gas (containing 2% helium) daily, recovering at least 92% of the helium in the



Three 45-ft high cold boxes containing heat exchangers, phase separators, fractionation, and liquefaction equipment, separate 90% pure helium from natural gas

feed. This amounts to an average monthly production of 30 million cu ft, which is approximately equal to the combined output from all other helium plants in the country.

Heart of plant is the low temperature extraction equipment. This removes helium at 90% purity from the natural gas stream. Extraction is accomplished by cooling feed gas with  $-300^{\circ}\text{F}$  nitrogen. Most of the other components in the stream are liquefied and separated from the helium at this temperature.

There are three units performing this job at Keyes. Each processes over 23 million cu ft of natural gas per day. Cooling is accomplished in specially designed heat exchangers. High speed turbo expanders supply refrigeration for the process. The 90% pure product is then sent to final purification section of the plant.

**Drying**

Moisture is removed from crude-helium stream by means of 18' high dryer. Operated at 2750 psig, unit has design capacity of 2.5 million cfd of air. At that pressure it reduces dewpoint from approximately  $+80$  to  $-40^{\circ}\text{F}$ . Dryer operates with fully automatic-time-cycle regeneration system. Drying cycle is completed in eight hours without attention of operator.

(Dryer is product of Desomatic Products, Inc., 1109 W. Broad St., Falls Church, Va.)

Check 3418 opposite last page.

(Low-temperature process equipment was supplied by Air Products Incorporated, Allentown, Pa.)

Check 3419 opposite last page.

Fuel cells are subject of 115-page report which includes reviews of research progress, potential advantages, and historical summary. OTS PB 151804, prepared in the Army Research Office, may be purchased for \$1.25 from Office of Technical Services, Sales and Distribution Section, U. S. Department of Commerce, Washington 25, D. C.

**NEW LENAPE WEDGE MANWAY\* Eliminates Bolts and Yokes**



This revolutionary, new manway is not only easier to open and close, but is actually more economical than conventional bolted covers. Noted for its simplicity, the Lenape Wedge Manway assembly is a unique combination of only three metal parts—ring, cover and key wedge, plus a standard gasket, and is supplied as a "package" assembly.

**FAST, SIMPLE OPERATION**—As illustrated, to close the manway you insert the key wedge under the cover handle and over the opposite ring wall. Then, merely tap the wedge gently with a hammer until a tight seal is secured. That's all there is to it. Troublesome bolts and yokes are completely eliminated. Uniform gasket loading is assured.

To open, you just tap out the wedge and remove the cover—all in a matter of seconds.

Write today for full details and prices on the amazing new Wedge Manway Assembly—another Lenape exclusive.

\*Patent pending

LENAPE

PRESSURE  
VESSEL  
CONNECTIONS

See our standard line of pressure vessel connections on pages 438-439 in the 1960 Chemical Engineering Catalog.

LENAPÉ HYDRAULIC PRESSING & FORGING CO.

DEPT. 100 WEST CHESTER, PA.

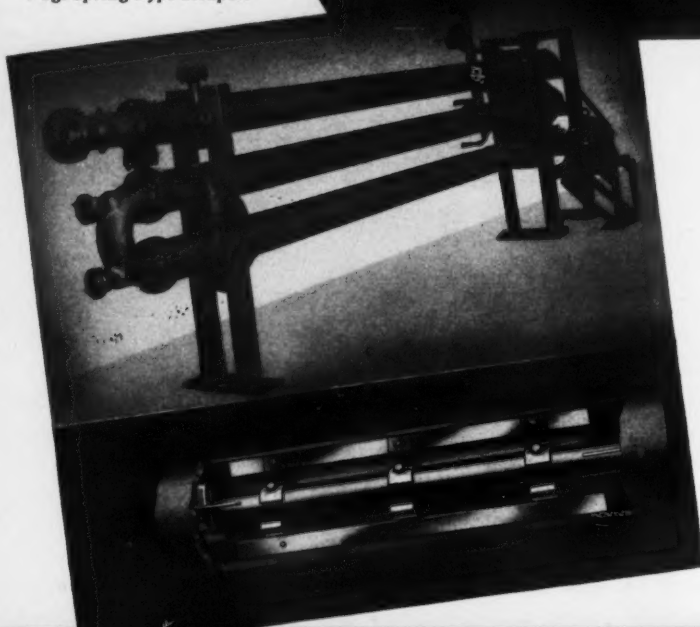
RED MAN PRODUCTS

Check 3416 opposite last page.

# Vogt

## Solve EXCHANGERS Heat Transfer and Crystallization

BELOW: A scraped surface unit for production of Para-Xylene by fractional crystallization. Insert shows detail of Vogt Spring Type Scraper.



### ... And Here's How:

1. Rotating scraper action continuously sweeps surfaces clean even while processing highly adhesive materials.
2. Uniform rate of heat transfer keeps crystallization under control and discharges crystals as a slurry.
3. Product is thoroughly mixed by scraper blades as it flows.
4. Closed, pressure-type system permits use of flammable, volatile and expensive solvents with complete safety and no solvent loss.
5. Units fabricated from a broad range of materials to suit process stream characteristics.

Write for Literature. Address Dept. 24A-XCP

Listed here is a wide variety of materials which have been successfully processed with Vogt Scraped Surface Exchangers in the chemical, petro-chemical, petroleum and related industries.

Benzene Hexachloride  
Caustic Soda  
Caustic Potash  
Clay  
Cylinder Stock  
Para-Dichlorobenzene  
Fatty Acid Solutions  
Fish Oil  
Linseed Oil

Naphthalene  
Paratone & Solids  
Phenolic Resins  
Polyester Liquid  
Pressed Distillate  
Reduced Petroleum  
Waxy Oil-Solvent Mix  
Soybean Oil  
Sperm Oil

Sugar Syrup  
Sulfur-Oil Mix  
Sulphate Solution  
Tall Oil-Naphtha-Sulfuric  
Acid Solutions  
Tetrachloro Benzene  
Viscose  
Wax Slurry  
Para-Xylene



HENRY VOGT MACHINE CO.  
Louisville 10, Ky.

### NEW LITERATURE

Ideas and New Trends

**Water-treatment plants** to provide high quality feed water for boiler pressures over 1500 psi, once-through boilers for supercritical pressure (over 3206 psi), and in nuclear plants are reviewed in Reprint 123—Cochrane Corp.

Check 3422 opposite last page.

**Compressed air dehydration** as performed by refrigerated condenser-type filter is explained in four-page bulletin. Unit reduces dew point of compressed air to -10°F at 100 psi. Bul F-100 — Hankison Corporation.

Check 3423 opposite last page.

**Radiographing equipment methods** are described in 12-page booklet. Chart of equivalent energies, showing exposure times needed to radiograph materials of varying thicknesses is also included. "Industrial Radiography With Radioisotopes" — Picker X-Ray Corp., subsidiary, C.I.T. Financial Corp.

Check 3424 opposite last page.

**Plastic preheaters** are topic of six-page folder. Charts show power output rating for each of four dielectric units. Specifications and applications are included. "Thermex Plastic Preheaters" — Girdler Process Equipment Division, Chemetron Corporation.

Check 3425 opposite last page.

**Structural shapes** for industrial model-builders are listed in eight-page catalog. Units are made of steel gray polystyrene and are available in I's, H's, angles, channels and tees — sizes ranging from 1/8 to 1 1/4". Scale Model Components — Industrial Models, Inc.

Check 3426 opposite last page.

**Use of radioisotopes** for studying lubrication and wear, surface phenomena, and physical measurements is covered in booklet. "Radiochemistry Plus" — Foster D. Snell, Inc.

Check 3427 opposite last page.

**Nuclear irradiation services** are described in illustrated 10-page bulletin. Photographs and description of largest privately owned materials testing reactor is also included. Bul GEA-6934 — General Electric.

Check 3428 opposite last page.

**Beryllium's role** in manned orbital space capsule is pictorially reviewed in 20-page booklet. "Beryllium in Project Mercury" — The Brush Beryllium Company.

Check 3429 opposite last page.

Check 3421 opposite last page.

## Synthetic Rubber: 1965 From page 29

said to be ready to announce such plans.

It is generally felt that product evaluation and process development on polyisoprene are farther along than that on polybutadiene. The best polyisoprene is probably not yet on the market. It will at least be the equivalent of high-grade natural, with perhaps a more favorable balance of non-polymeric constituents. This will result in better color and more uniform quality, and with less plasticating required. Availability of isoprene at prices approximating butadiene is said to be assured. On this basis commercial isoprene at natural-rubber range prices will be a fact in the near future.

Polybutadiene is a completely new type of rubber, not just an equivalent to natural. Initial testing has been as an extender to natural rubbers. Papers have been presented before technical groups, detailing its successful use in ratios to 50%.

Special compounding and processing techniques are required to make the raw rubber manageable for extrusion. It does have excellent abrasion resistance. Very probably, additional time will be required before polybutadiene's niche in the field of rubber polymers can be determined. This statement is made despite the fact that the butadiene monomer is readily available on the market at prices below 15c/lb, in sufficient quantity to support several commercially sized plants.

### Ethylene-propylene Rubbers

The ethylene-propylene rubbers are the outgrowth of intensive efforts in the field of organo-metallic catalysts. Such efforts led to commercialization of high-density polyethylene and polypropylene. Most companies associated with production of these plastics are undoubtedly at least investigating the ethylene-propylene rubbers.

Information released by

Montecatini indicates that these types show promise as specialty rubbers, general-purpose rubbers or both. As specialties, they bear considerable resemblance to butyl rubber, particularly in properties of resistance to ozone, sunlight, weathering, acids and alkalis.

In the general-purpose field, the ethylene-propylene rubbers probably cannot be much of a factor by 1965. However, one of the most intriguing considerations is that ethylene and propylene are both commercial monomers available in large quantities at prices in the range of 5 to 6c/lb delivered.

### Natural-rubber Price Future

There is considerable respect in the industry for the ability of the natural-rubber people to produce rubber at a profit, at considerably lower-than-current prices. This appears to be one of the reasons for the rather slow and cautious development of commercial plants to produce polyisoprene and polybutadiene. Another is that developing new processes and testing new products takes time in this industry. There seem to be no shortcuts.

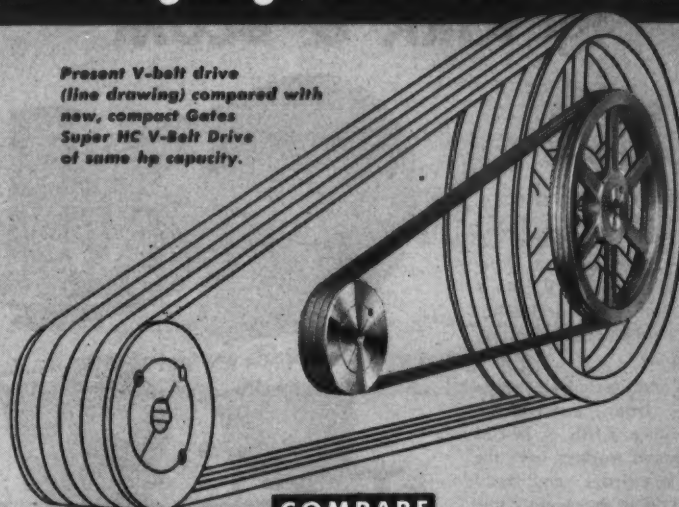
However, indications are that by 1965 a considerable volume of synthetic rubbers with natural-rubber properties will be required and plants constructed for their manufacture.

### NEXT MONTH

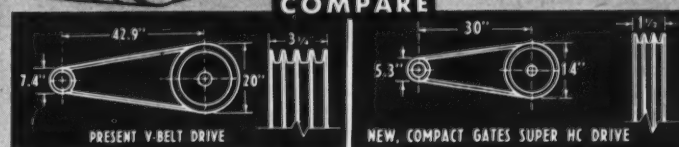
The provisions of The Anti-dumping Act are simple in concept and administration. At least this is the considered opinion of James Pomeroy Hendrick, Assistant to the Secretary of the Treasury. To see if you agree, read his explanation of the various ramifications of the law in this section next month.

## Designing NEW DRIVES?

Present V-belt drive (line drawing) compared with new, compact Gates Super HC V-Belt Drive of same hp capacity.



### COMPARE



## Save up to 20%

with new high capacity V-belt drive

When you change the whole drive — both V-belts and sheaves — remember: The cost of a Gates Super HC V-Belt Drive is as much as 20% less than the cost of present V-belt drives of the same horsepower capacity.

A development of Specialized Research in the world's largest V-belt laboratories at Gates, the new Super HC V-Belt makes possible the most compact, lightest-weight, lowest-cost multiple V-belt drive you can put on any machine!

### Cuts drive space as much as 50%

With Gates new Super HC V-Belt, sheave diameters and widths can be reduced 30% to 50%, center distances 20% and more. Bearing load is lightened and total space occupied by the drive may be cut as much as 50%.

"The Modern Way to Design Multiple V-Belt Drives" is an informative handbook on the Super HC Drive, available from your nearby Gates Distributor listed in the Yellow Pages of your phone book.



The Gates Rubber Co., Denver, Colorado

Gates Rubber of Canada Ltd., Brantford, Ont.

World's Largest Maker of V-Belts

TPA 439

# Gates SUPER HC V-BELT Drives

Check 3430 opposite last page.



# Stainless Steel Fabrication by KIRK & BLUM

**Sheets,  
Light Plate  
and Structurals**

With over 50 years of experience in the field, KIRK & BLUM offers economical fabrication to the most exacting specifications.

Stainless fabrication is quite different from conventional steel working. KIRK & BLUM engineers and workers have the special knowledge and techniques to do an outstanding job. In all-important welding, for example, selection of the best process . . . metallic arc or inert gas arc welding, seam or spot welding; prevention of distortion and warpage; prevention or removal of discoloration; prevention of disturbance of chemical and physical properties which might lead to corrosion . . . all contribute to a first quality fabrication job.

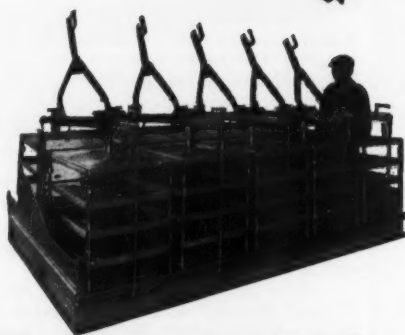
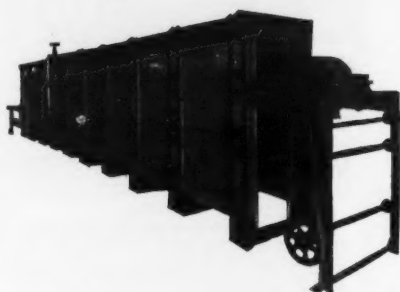
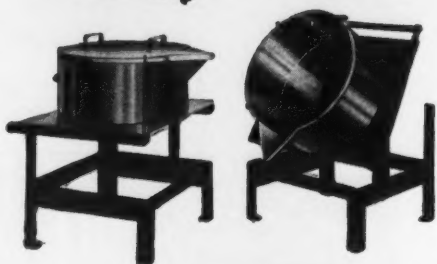
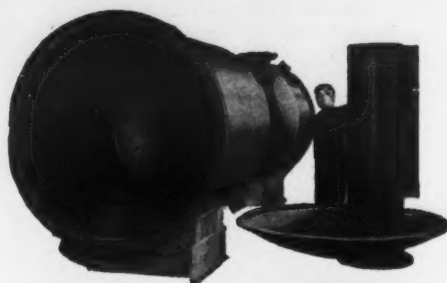
Whatever your requirements, KIRK & BLUM facilities are at your service. For prompt quotation, send prints and details to: The Kirk & Blum Mfg. Co., 3133 Forrer St., Cincinnati 9, Ohio.

## Complete Facilities to 1/2" Capacity

- Square & Rotary Shearing
- Braking, Forming & Rolling
- Punching, Riveting & Drilling
- Arc, Spot & Seam Welding
- Inert Gas & Submerged Arc Welding
- Grinding and Finishing

Literature on Request:  
"SHEET and PLATE FABRICATION"  
"ELECTRICAL ENCLOSURES"

THE  
KIRK AND BLUM  
MANUFACTURING CO.  
3133 Forrer St.  
Cincinnati 9, Ohio



# KIRK & BLUM

## Chemical Distributor

From page 27

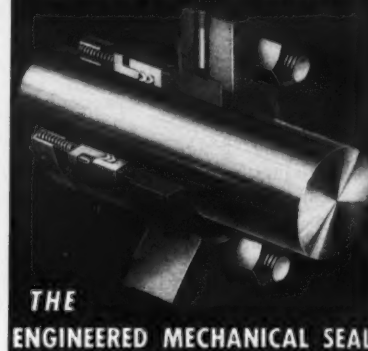
undesirable, such as:

- 1) Using price cutting as a mechanism of obtaining business. (This includes commission-splitting which is reported to have prevailed in certain trades.)
- 2) Using transportation-cost absorption or other gimmicks to secure orders.
- 3) Encouraging use of imported materials. In this problem area distributor and producer should analyze their foreign competition and jointly decide how to handle it.
- 4) Compete with the producer on products or in areas where he has his own sales organization (unless this is understood in advance).
- 5) Expect producer subsidy to grow to an extent the distributors' own efforts and the logic of his function will not justify. In this case the distributor becomes an uneconomic means of marketing.

In the 1960's demands for goods and services will reach peaks never before experienced. The capable chemical distributor will fill an important role in this picture. The producer will be glad to join forces, each working in his own specialized area of service. The joint marketing effort will be effective in making the chemical industry an even greater portion of the American economy than it is today.



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For free engineering counsel on  
your sealing problems . . . write



DURAMETALLIC CORPORATION  
KALAMAZOO, MICHIGAN

Check 3432 opposite last page.  
CHEMICAL PROCESSING

Check 3431 opposite last page.

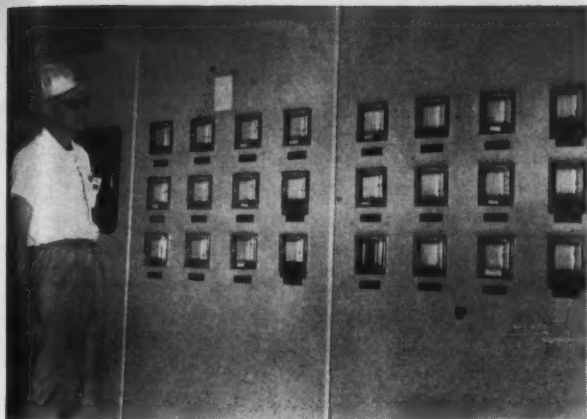


Figure 1

CP Staff Photo

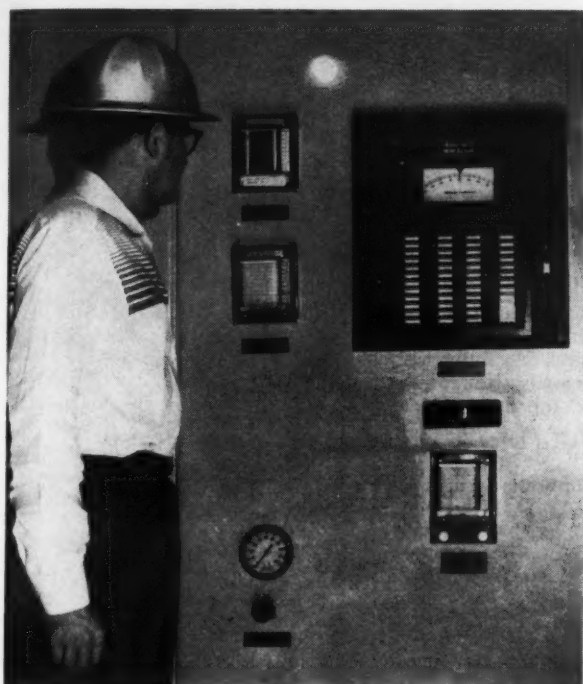


Figure 2

CP Staff Photo

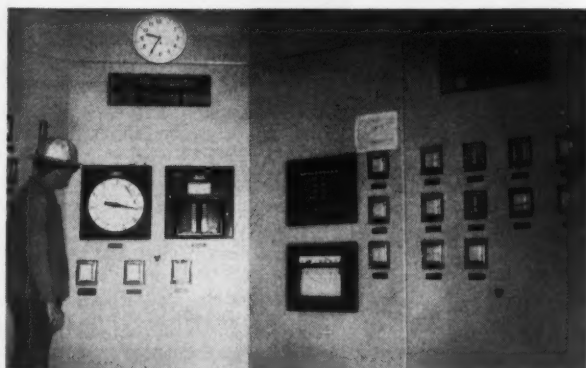


Figure 3

CP Staff Photo

## Monitor Polyethylene Reactors

Close measurement and control of flow, pressure and temperature enable plant to meet rigid specifications and produce high-quality product

GORDON WEYERMULLER, Associate Editor

with LEONARD E. EMGE, Head of Process Engineering, Celanese Plastics Company  
Div. of Celanese Corporation of America, Deer Park, Texas

AT the Celanese low-pressure polyethylene plant near Houston, reactor temperatures are critical. Instrumentation provides close control and measurement of reactor temperatures as well as other variables. Solvent recovery and purification and extrusion are also aided by the pneumatic and electronic instruments, which help plant to continuously meet rigid specifications.

Plant, which uses the Phil-



CP Staff Photo

lips process, is rated at 40 million lb per year. Description of the part each group of instruments, shown in photographs, plays in controlling plant follows:

Fig 1 shows section of panelboard controlling flow, pressure and temperature of reactors while reaction is taking place and while cooling. These are all pneumatic instruments. Miniature strip charts do not take up much space on panelboard. Each chart has a continuous record for one month.

Fig 2 shows multi-point electronic indicator used for measuring temperatures of various points on each of several reactors. Reactor temperature is critical. This indicator serves as a check on control instruments.

Fig 3 shows temperature and flow controls for solvent recovery. In this operation solvent is being boiled off. Control of temperature is im-

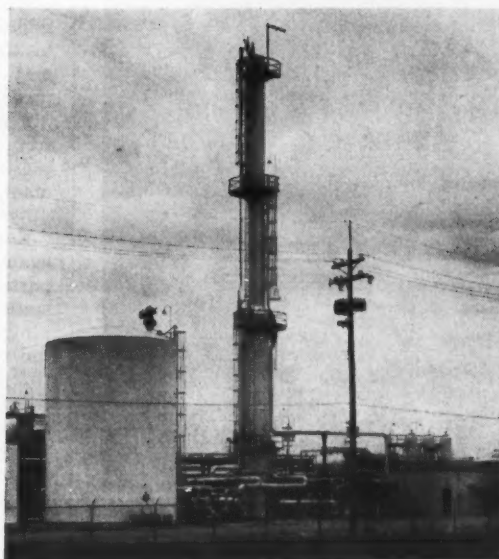
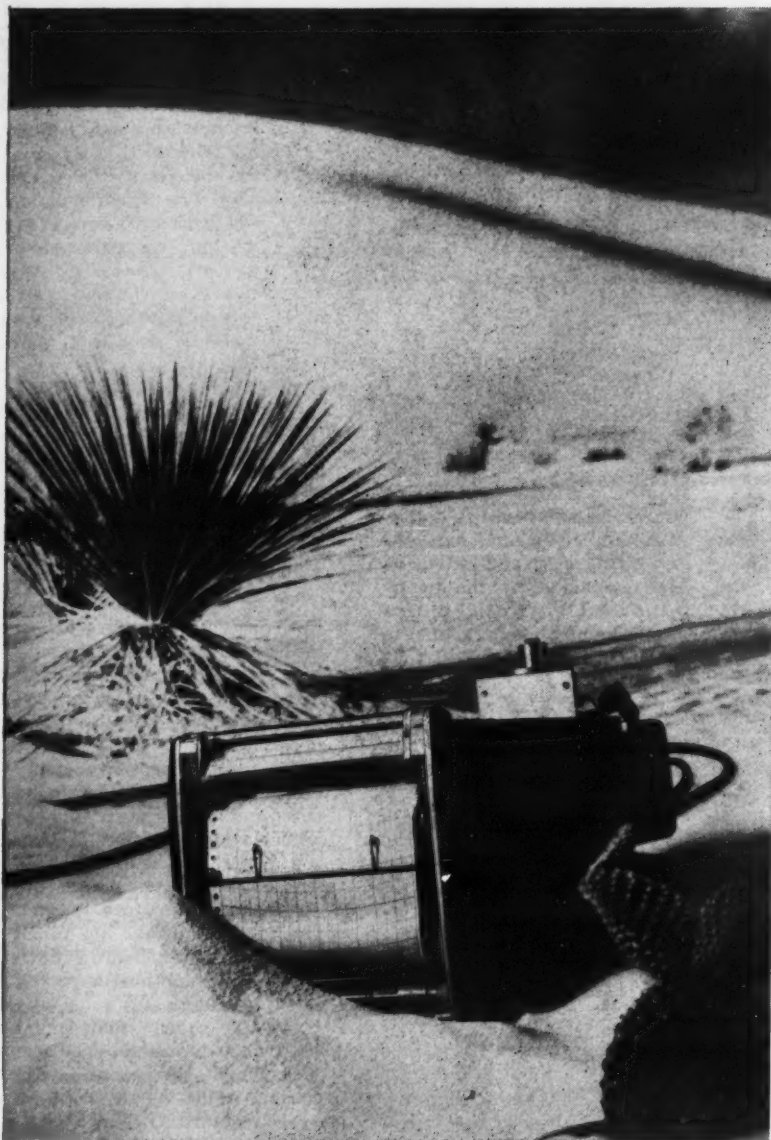


Figure 4 ▶

## KEEP YOUR INSTRUMENT AIR LINES DESERT-DRY...

Get Lectrodryer—it costs you *less* to pay *more*. When product quality hinges on the performance of sensitive pneumatic instruments, it doesn't pay to skimp on instrument protection. Lectrodryers give you *proved drying ability*, plus long-range dependability, and that's why they cost somewhat more. They are designed generously; materials are of the best. Ask about the new Lectrodryer Budget Dryer. It's built especially for instrument service, when small quantities of air are required. Other standard Lectrodryers are available for larger volumes. Contact Pittsburgh Lectrodryer Division, McGraw-Edison Company, 352 32nd Street, Pittsburgh 30, Pennsylvania.



# Lectrodryer<sup>®</sup>

Check 3433 opposite last page.

## INSTRUMENTS & LAB

portant here to efficiently recover solvent. Temperature can be controlled to less than  $\pm 1^\circ\text{F}$ . Range is  $140\text{--}185^\circ\text{F}$ . Pneumatic instruments are used here since distance is not a major problem.

Electronic and pneumatic instruments are used for controlling flow, pressure and temperature during purification of solvent. In solvent purification step, certain impurities which act as catalyst poisons when present in ppm quantities, are removed. This is so critical it can shut plant down.

Fig 4 shows the solvent purification column controlled by instruments discussed in preceding paragraph. Column operates at a set pressure and varying temperatures for required purification.

As hot plastic is extruded and cooled, temperature is monitored by an electronic recorder.

(Electronic and pneumatic instruments at Celanese plant are products of Industrial Div., Minneapolis-Honeywell Regulator Company, Wayne & Windrim Ave., Philadelphia 44, Pa.)

Check 3434 opposite last page.

### Metering pump accuracy to $\pm 1\%$

**Uses:** Sampling, and injection of process fluids into systems against pressures up to 4000 psi. Higher pressures may be accommodated through heavy-duty units.

**Features:** Capacities range from 0.65 to 2025 gal/hr with these new positive-displacement, plunger-type, heavy-duty metering pumps.

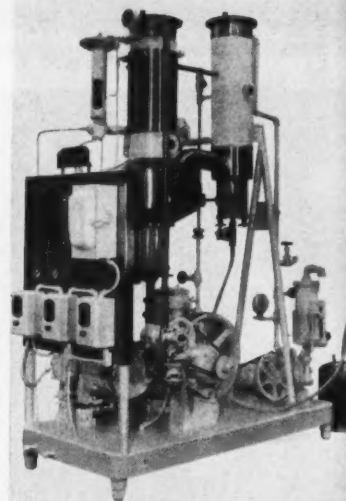
Enclosed drive protects against dangerous moving parts. Adjustment handle is stationary while pump is running; only movement is manual rotation for changing setting.

Pump may be fitted for automatic stroke control, including ratio control.

Liquid ends are changeable as complete units, quickly and easily, for different capacities of liquids. One eas-

## pilot run evaporation

with the  
**Mojonnier**  
**LO-TEMP**  
**EVAPORATOR<sup>®</sup>**  
(HEAT PUMP PRINCIPLE)



- no steam required
- concentrates heat-sensitive batches at temperatures of  $45^\circ$  to  $90^\circ\text{F}$ .
- recovers both concentrate and condensate.
- for pharmaceuticals, biologicals, essences, extracts and other chemical solutions such as alcohol, pyridine, acetone, etc.
- lowest operating cost.

Mojonnier Model LTS1 Lo-Temp Evaporator is the ideal tool for running check tests at low cost. It concentrates up to 5 gallons—finishes from 1/2 to 1 gallon batches. Evaporates 25 to 50 pounds of water per hour on low viscosity liquids—10 to 15 pounds of water per hour from high viscosity products. Designed for highly efficient evaporation, using the heat pump principle.

**Operating requirements:** Water—1 GPM; Air—0.5 CFM at 25 PSI; Power—to drive 3.25 hp compressor.

Bulletin 382-15 for complete details.  
Write: **MOJONNIER BROS. CO.**  
4601 W. Ohio St., Chicago 44, Illinois

**Mojonnier**  
QUALITY ENGINEERING FOR ECONOMY

Check 3435 opposite last page.

CHEMICAL PROCESSING



ily accessible clamping bolt adjusts self-aligning packing gland.

**Description:** Unit consists of standard electric motor, drive unit, crosshead, and 1,2, or 3 liquid ends — all mounted on a heavy steel base plate. Pump drive shaft runs in heavy ball bearings. Load is applied solely between these bearings.

Stroking speed is determined by gear ratio of a worm and worm gear.

Various ganging arrangements are possible. Liquid ends are available in a variety of materials, including plastics.

(Series 200 metering pumps are a product of Wallace & Tiernan, Inc., Belleville, N.J.)

Check 3436 opposite last page.

**Pressure regulator  
remotely shut-off  
by solenoid**

Low cost units easily operate on-off

**Uses:** Control of steam, air, and liquids to 250 psi and 500°F.

**Features:** When solenoid is actuated, main valve performs as standard regulator. When solenoid shuts off, main valve shuts off, eliminating need for gate valve. Both valves are packless, all metal. Automatic safety shutoff; electric power failure closes solenoid, shuts off regulator.

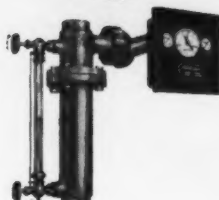
**Description:** Available in ½ to 3" pipe sizes. Available in ductile iron, bronze, and cast iron. Stainless seats used in both solenoid and main valve with straight through flow seats standard in main valve. Solenoid enclosed NEMA I (indoor normal conditions); has coils insulated for continuous duty at maximum temperatures. Operates at standard voltages, AC or DC.

(Solenoid actuated regulators are available from Jordon Corporation—Division of OPW Corporation, 6013 Wiehe Rd., Cincinnati 13, Ohio.)

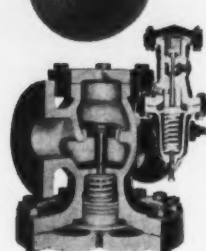
Check 3437 opposite last page.



SPLIT-BODY  
VALVES



LEVEL  
CONTROLLERS



PRESSURE  
REGULATORS



DIAPHRAGM  
CONTROL VALVES

## KEEP A FIRM HAND ON FLUID CONTROL WITH K&M VALVES ALL ALONG THE LINE

From the complete display on the K & M shelf, you can select the best type of valve for every control job in the process line. You can, in fact, standardize entirely on K&M. That means simplified specification, ordering, maintenance.

Especially maintenance. K & M engineers have put consistent design emphasis on field interchangeability of components. In a pinch, you can "borrow" an inner valve or a topworks assembly from a pressure regulator for use with a diaphragm motor valve. That's what we mean by interchangeability.

And because the K & M line is so diverse and inclusive, our field representatives are free to make unbiased suggestions on the type of valve best suited to your requirements. That can often mean substantial dollar savings all along the process line.

THREE TECHNICAL BULLETINS GIVE THE IMPORTANT  
FACTS AND FIGURES. THEY'RE YOURS FOR THE ASKING.



Bulletin 401  
Pressure-  
Regulating  
Valves



Bulletin 132  
Split-Body  
Valves



Bulletin CV53  
Standard  
Diaphragm-  
Operated  
Control Valves



diaphragm control valves

Our 79th Year

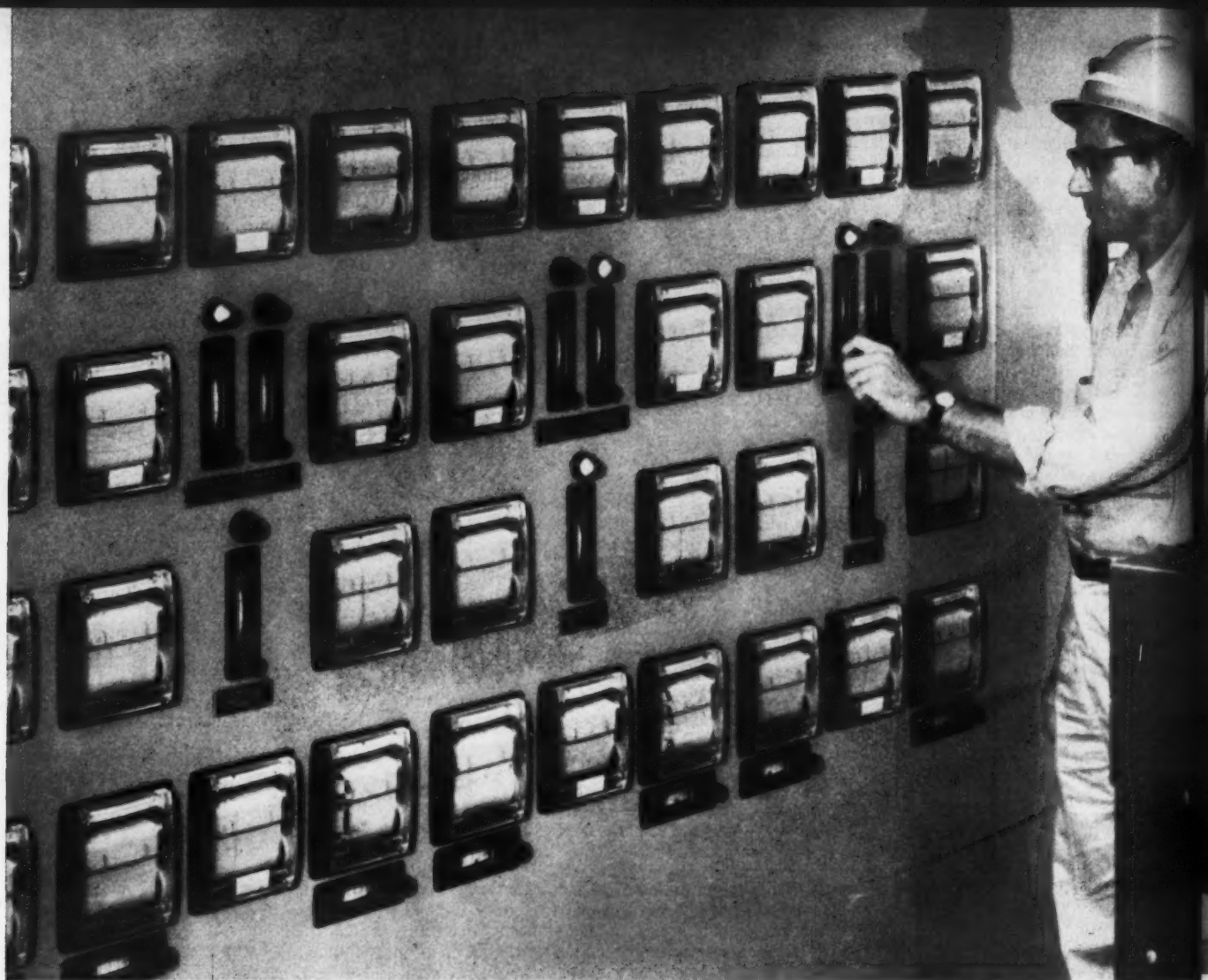
S.A. 1721



KIELEY & MUELLER, INCORPORATED

Oldest Pressure and Level Control Valve Manufacturer  
64 Genung Street, Middletown, New York

Check 3438 opposite last page.



Foxboro Consotrol control panel at W. R. Grace & Co. polyethylene plant in Baton Rouge, Louisiana.

## Foxboro Consotrols\* help put 50 million pound

**"Perfect instrument performance on start-up," reports W. R. Grace & Co.'s**

50 million pounds of GREX — W. R. Grace & Co.'s new high strength plastic resin — that's the capacity of their new Polymer Chemicals Division plant in Baton Rouge, La. Instrumentation for the 30 acre, multi-million dollar facility was supplied by The Foxboro Company.

"Our main Foxboro panel was a big help in getting this temperature-controlled process off to a successful start," reports instrument supervisor Al Farris. "Over 95% of the variables on the panel are con-

\*Reg. U.S. Pat. Off.

trolled — many of the key ones are part of cascade control systems. Instrument performance on start-up was perfect."

Grace instrument men like their Foxboro pneumatic Consotrols for other reasons as well: The M/54 Recorder's 4-inch vertical-travel chart . . . the drawer-type pull-out feature of Consotrols . . . the fact that in 18 months of operation not a single Consotrol has needed re-calibration.

Foxboro Consotrol instrumentation includes con-



## polyethylene plant on stream without a hitch

### Polymer Chemicals Division

control functions for all types of processing requirements — auto-selector . . . cascade and ratio systems . . . automatic batch control. Get the complete story by writing for Bulletin 13-18. **The Foxboro Company, 812 Neponset Ave., Foxboro, Mass.**

# FOXBORO

REG. U.S. PAT. OFF.

30-acre W. R. Grace & Co. Polymer Chemicals Division plant has 50 million pound annual capacity. First product — new high strength plastic resin tradenamed GREX.



For more information on product at left, specify 3439 see information request blank opposite last page.







## Yarway Impulse puts the heat on steam trap freeze-up problems

Cold weather means nothing to a Yarway Impulse Steam Trap. Its design offers full protection against freeze-ups, with resulting costly production delays and extra maintenance work.

In the Yarway Impulse Trap there's nothing to freeze. No condensate collects. The only moving part (a tiny piston-like valve) continually tests for condensate and discharges it as soon as it forms. Result—continual operation of steam equipment at high, even temperatures.

Consider this non-freeze feature with these other Yarway Impulse features:

- Quick heat-up
- Low maintenance
- Stainless steel construction
- Small size—light weight
- Good for all pressures
- Complete line for all requirements

—and you have the reasons for nearly 1,300,000 successful installations.

Stocked and sold by 270 Industrial Distributors, coast-to-coast and around the world.

**YARNALL-WARING COMPANY**  
100 Mermaid Ave., Philadelphia 18, Pa.  
BRANCH OFFICES IN PRINCIPAL CITIES



Check 3440 opposite last page.

### Meters gas at pressures to 600 psig

**Uses:** Meters wide range of chemical gases, unaffected by pulsation or line surge.

**Features:** Unit employs rotary positive displacement principle. Accuracy is  $\pm 1\%$  throughout a flow range to 100% of rated capacity. Meter is equipped with reduced-speed power takeoff to drive indicating, recording or telemetering instrumentation.

Available models span range of flow measurement from seven to 38 million scf per 24-hour day at max pressure.

**Description:** Encased in welded and bolted steel housings, the units are hydrostatically tested at 150% of rated working pressure.

Flanged inlet and discharge connections simplify mounting in horizontal pipe lines and provide straight-through gas flow. Units are completely self-supporting. Special provisions can be made for handling gases not compatible with ductile iron and steel.

(Meter is product of Roots-Connorsville Blower, one of the Dresser Industries, Inc., 900 West Mount St., Connorsville, Ind.)

Check 3441 opposite last page.

### Transistorized miniaturized digital computer handles major calculations

**Uses:** Complete range of engineering problem calculations, including optimizing conditions under which a process plant can be operated. Said to be excellent for heat exchanger design and other applications where wide ranges of variables entailing large numbers of calculations enter into the determination of design alternatives.

**Features:** Extremely large in capacity; can retain over 8000 instructions at a time, or store over 49,000 decimal digits of data. Magnetic disc memory contains 4096 words, each of 40-bit length, including 16 words placed in high speed loops.

Standardized teletype tape

**New Money Makers for Industry:****KIN TEL CLOSED CIRCUIT TV SYSTEMS**  
*what they are, and what they can do for you...*

configuration is used, with built-in automatic conversion to binary form.

High-speed photoelectric tape reader reads 400 characters/sec. Can be used to verify all data stored. Over 48,000 characters can be transmitted to memory in less than two minutes.

Built-in floating point arithmetic, including square root.

All transistorized, contains no vacuum tubes nor fragile parts. Sturdy and compact. Uses little power — 400 watts — generates practically no heat. Uses printed circuitry on plug-in cards, making maintenance simple.

**Description:** Five components consist of: Computer and memory, photoelectric tape reader, typewriter, tape punch, and console.

Tape, coded with problem solution plan (program), is put into the computer through photoelectric reader. Applicable data are then fed into system with console keyboard or typewriter keyboard, on punched tape. Answer is delivered via typewriter or punched tape.

Performs addition at 1852/sec. Fixed point multiplications in 10.8 milliseconds. Floating point multiplication in 12.4 milliseconds.

Complete unit weighs only 197 lbs. Requires no special installation, can be plugged into any standard wall outlet. No air conditioning necessary.

(Recomp II computer is product of Autonetics Industrial Products, Division of North American Aviation, Inc., 3584 Wilshire Blvd., Los Angeles 5, Calif.)

Check 3442 opposite last page.

**NEXT MONTH**

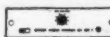
Control functions are critical in manufacture of American Cyanamid's acrylic fiber. Handling flow of reacting materials and cooling brine poses a tough throttling job for control valves, and accuracy must stay within  $\pm 1\%$ . In this section next month you'll learn the answer to dependable repeatable process control.

**What is a KIN TEL Closed Circuit TV system?**

The basic closed circuit television system manufactured by KIN TEL consists of a camera, a camera control unit and a monitor (receiver) each connected by cable. The camera can be located at great distances from the monitor, and any combination of cameras and monitors can be used.

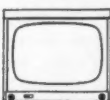


The camera is small enough to hold in your hand; rugged enough to operate in 150° F. without a protective housing; sensitive enough to provide excellent pictures of objects illuminated by only a candle.



The camera control unit provides automatic operation.

The system is continuously self-adjusting for wide variations in light levels (several thousand to one), and features automatic high definition of bright objects. The only control you have to touch is the on-off switch.

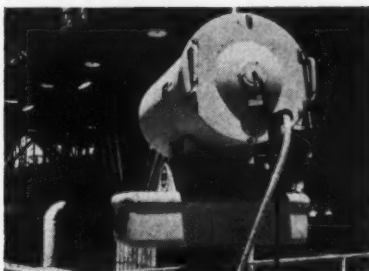


The monitor displays a crisp, clear picture...full 650-line resolution, twice that of the best home TV reception.

**How are such systems used?**

Today, KIN TEL closed circuit TV systems are performing a number of jobs for hundreds of firms, safely, inexpensively, tirelessly.

*They are being used to watch operations or events that are tedious, difficult, dangerous, or even impossible for men to watch.*



**For example:** Convair (above), Douglas, Lockheed and Northrop watch rocket tests with KIN TEL systems. U.S. Steel uses one to see inside open hearth furnaces. Westinghouse watches nuclear power reactor tests with one.

*They are being used for surveillance.*

**For example:** The San Francisco Naval Shipyard uses one to guard against pilferage.

*They are being used for traffic control.*

**For example:** The Alameda Naval Air Station uses a KIN TEL TV system to

observe aircraft landings on the portion of the runway that is not visible from the control tower.

*They are being used to transmit visual information quickly and accurately; for remote observation of charts, meters, graphs, schedules, blueprints, photographs, images from microscopes, fingerprints, signatures...the list is almost endless.*

**For example:** E. F. Hutton uses a KIN TEL system to transmit stock market quotations to the offices of the firm's executives. The Los Angeles Department of Water and Power uses one for remote viewing of water-level meters. The University of California teaches physics with one.

*They are being used for monitoring any operation that normally requires standby personnel.*



**For example:** American Potash and Chemical (above) monitors conveyor line and warehousing operations with a KIN TEL TV system.

**Why do these firms choose a KIN TEL system?**

For a variety of reasons.

**First, reliability.** KIN TEL TV is designed for continuous duty operation in severe environments. Day in and day out, it keeps working. It's the first choice for ICBM and other missile programs that really depend on TV, that can't chance failure, that can't afford to compromise with reliability.

**Second, picture quality.** KIN TEL TV presents clear, sharp pictures. Full 650-line resolution provides maximum data...essential for quantitative observation of complex operations or transmission of printed material.

**Third, automatic operation.** KIN TEL TV is the only closed circuit system that provides entirely automatic, through-the-lens compensation for light-level changes of several thousand to one.

**Fourth,** the KIN TEL closed circuit TV system is extremely sensitive. The light required to read this page is enough for sharp clear pictures, and usable pictures can be provided with less than one-foot candle illumination.

**Fifth,** KIN TEL TV systems are easy to install and simple to operate. With no changes in lens iris to make, with no difficult, interacting electrical adjustments required, the only thing the operator has to know is the location of the on-off switch.

**Sixth,** a complete line of shelf-item system components and a variety of cameras and monitors make virtually any application feasible...permit observation of nearly every kind of operation, under all kinds of conditions.



For example, with system components, you can remotely position the camera, remotely select one of several lenses, remotely "zoom" in or out; for closeup or wide-angle viewing, operate the camera in extremes of temperature or in explosive or dusty atmospheres, view microscope images. Whatever your viewing problem, KIN TEL probably has a stock solution.

**Seventh,** you don't have to waste your time and money on application engineering. At no obligation to you, KIN TEL's nationwide factory-trained field engineers — thoroughly experienced in optics, environmental requirements, lighting, cabling, human engineering factors, and other installation considerations — can determine whether or not closed circuit TV can be put to profitable use in your intended application.

**What can a KIN TEL system do for your business?**

It can do what it is doing right now for hundreds of other firms. It can save you time and money...increase efficiency...better your service to clients and customers. To find out how, write direct for catalog 6-103 and the name of your nearest KIN TEL engineering representative.



5725 Kearny Villa Road, P. O. Box 623, San Diego 12, California, BRowning 7-6700

*KIN TEL—pioneer and leader in closed circuit television.*

Check 3443 opposite last page.

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# Newark Wire Cloth COMPANY

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Check 3444 opposite last page.

## PROCESS DYNAMICS

# What you should know about automation planning

### PORTER HART

Director, Process Control Laboratory  
Dow Chemical Company  
Texas Division, Freeport, Texas

THERE is a great need in the chemical industry to keep abreast of the progress of instrumentation. To do this, we must have means of communicating advancements and techniques to all who can use them. This must be done so that management, engineers and researchers alike can assimilate and in their specialized ways use such information. Good "automation planning" is needed if specialist groups which have not worked in such close unison before, will now do so. As an aid, I will in the following review some of the present-day considerations.

Chemical process, stream analysis has been developed to the point that instruments are now "educated" to see, feel, taste, smell, and hear operating factors. Also to make adjustments for general operating conditions.

A good example of an extensive use of such devices is the Badische chemical plant at Ludwigshafen, Germany. It has more than 650 infrared analyzers in continuous use. At the Bayerwerk plant at Leverkusen, more than 360 infrared analyzers, as well as many other types of instruments, are at work on process streams. I did not, incidentally, see any control laboratories in the operating areas — which suggests that to a large degree they have been eliminated.

One of the last great contributions to process instrumentation was the pneumatic force balance system. Many companies have used these, wherever possible, as they have been developed and made available over the past 10 to 12 years.

Until recently, electric control systems have been avoided by many because of the short life of certain electrical components — such as electrolytic condensers and especially those components which generate heat. Vacuum tubes and resistors are in latter category.

### Greater Dependability

Developments of solid state circuitry have now made electric control systems more dependable. With these systems are components such as magnetic amplifiers, transistors, silicon diodes, and tantalum condensers.

I now feel certain that these new electric systems will operate without failure for more than 10 years — which probably will be all of their useful life before obsolescence.

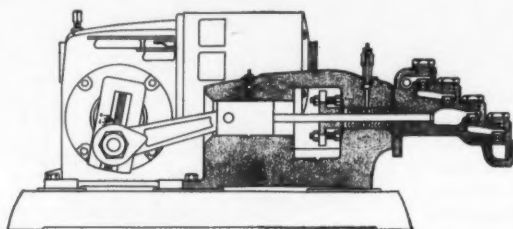
Most control valves, on the other hand, will still be operated pneumatically, with electric-to-air transducers. Electric valve operators available today still do not have the power, positioning and response speeds required for good process control.



## HOW TO METER ACIDS ACCURATELY AGAINST PRESSURE

Corrosive liquids present two major obstacles to achieving maximum metering accuracy, economy, and safety. For one thing, corrosion can introduce an intolerable ever-changing volumetric error. For another, corrosive liquids must be retained by the pump at all times. Leakage can endanger personnel and necessitate the premature replacement of pump parts and associated equipment.

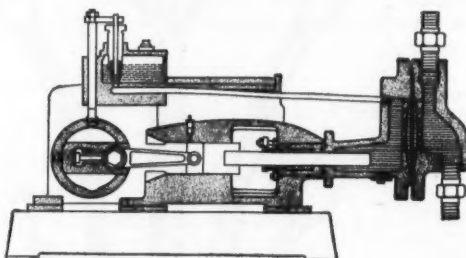
But both obstacles can be successfully overcome. First by choosing the right pump for the metering job at hand. Second, by making sure that all wetted parts of the pump chosen are inert to the liquid being metered. Here are some ideas based on practical acid metering experience that may help you to choose the one best controlled volume pump for your metering needs.



### Packed Plunger Pumps

For the majority of mildly corrosive liquids, low cost packed plunger pumps have proved themselves entirely adequate. Some thirteen materials of construction are standard on packed plunger pumps, running from cast iron to Hastelloy B and C, more than enough to satisfy mild corrosive metering requirements. Capacities to 2056 gph, pressures up to 50,000 psi.

*An added tip:* Standard Milton Roy motor driven pumps in corrosive service can be equipped with "catch-all" yoke type gland followers.

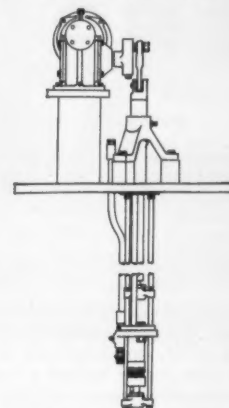


### Diaphragm Liquid Ends

When the liquid to be metered is highly corrosive or otherwise dangerous, a controlled volume pump with diaphragm liquid end is the best choice. A plastic or

stainless steel diaphragm positively separates the process liquid and the plunger. The plunger displaces a hydraulic fluid which in turn strokes the diaphragm to create pumping action through the ball checks. Consistently high accuracy is achieved through unique design features. As the illustration shows, positive mechanical action bleeds any air or vapor from the hydraulic side between strokes and corrects liquid volume if necessary. Internal liquid end design also automatically eliminates bubbles from the process liquid side.

Very often, a pump chosen for mild corrosive service is obsoleted by a process change specifying a more highly corrosive liquid. But this waste is neither necessary nor desirable. The diaphragm liquid end illustrated can easily be substituted for the conventional liquid end on any standard motor driven controlled volume pump, bringing the entire metering system up to date at little extra expense. *Designs of this type will handle up to 400 gph against heads to 2700 psi.*



### Totally Immersed Liquid Ends

Special metering problems demand special pump designs. For example, acids with high vapor pressure or high specific gravity must be pumped with limited suction lifts and generally require suction heads. The ideal answer is the standard Merse-metric® controlled volume pump. Pump drive and motor are mounted on the tank top, but the liquid end is completely submerged to a depth of up to fourteen feet. This same design feature also eliminates the need for tank connections below liquid level, and permits chemicals to be metered *directly* from storage.

The maximum safety-minimum handling Merse-metric design is just about standard for metering sulfuric acid for demineralizer regeneration and pH control of cooling tower water and deaerator effluents. *Capacities up to 218 gph, pressures up to 1200 psi.*

### The Acid Metering System

You can be fairly sure of making the right choice only if you consider *all* the factors. Here's a convenient checklist of a few points that are often overlooked:

- Is the entire system corrosion-resistant . . . storage tank, suction and discharge piping, controlled volume pump, and relief valve?
- Have you thoroughly considered the physical properties of the liquid? High vapor pressure or high specific gravity liquids may demand a suction head.
- Have you considered plant and personnel safety under all possible conditions?
- Have you considered maintenance as well as first cost in determining the economics of the system?

*If precision pumping of dangerous chemicals is one of your problems, look again to Milton Roy's 25 years of experience for your most economical solution. Write for a general introduction to controlled volume pumping in Bulletin 553-1. Milton Roy Company, 1300 East Mermaid Lane, Phila. 18, Pa.*

Controlled Volume Pumps • Quantichem Analyzers • Chemical Feed Systems



Check 3445 opposite last page.

Distance is no longer a barrier to remote operation. Many still have, however, control rooms in each of related plants. Control "centers" or "stations" will more widely be used in the future. With these, four or five plants will be operated from one center. All information from the related operations will be displayed by modern means, so that one operator will easily recognize operating difficulties. Another advantage will be that corrections can be made without having to depend on other means of communication.

Efforts are being directed towards console-type designs of control center units. Ultimately, such consoles will first operate an analog process simulator and or a pilot plant, and then be moved into later operation of the production plant. In larger production units, two or three or more consoles may be needed. With the aid of their simple circuitry, they will be made to perform practically any functions as the signals entering and leaving such systems can have the same common denominator.

The analog-type computer has been used for a long time in chemical process control! Every control loop having throttling range, reset, and rate adjustment is an analog computer which continuously monitors and automatically corrects adjustments. This type of instrument has only one input and output, and is used for static-state control of present plants.

### More Complex Control

Such devices cannot possibly keep more complex processing units such as reactors or fractionators continuously operating at maximum efficiency and productivity. Still required is dependence on operator's decisions for making controller adjustments. We do not, in indus-

## Highly Intimate Blends in 1 to 2 Minutes

### Blends while discharging; No segregation or flotation

Sturtevant Rotary Blenders start 4-way blending while charging, continue it during discharge, thus producing highly intimate, even blends of dry and semi-dry materials — within 3 to 5 minutes of start of charging.

Six complete blending cycles per hour are common. And Sturtevant's special action produces no particle reduction, cleavage or attritional heat — is highly effective yet gentle and safe even with explosives.



Receiving

Scoops cascade material as drum rotates. Movement forces material from both ends to middle. Thus blending is 4-way right from start of charging.



Discharging

Single gate controls charge, discharge. Blending continues throughout discharge phase. Result is no segregation or flotation — highly intimate, even blends.

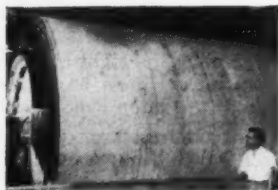
### Self-cleaning, dust-sealed drum; one-man accessibility

Operation of Sturtevant Blenders is self-cleaning — drum interiors are completely dust-sealed. For inspection of all models, one man simply loosens a few lugs to remove manhole cover — quickly and easily.

### Nine standard models with capacities to 900 cu. ft.



10 cu. ft. Sturtevant Blender at U.S. Steel Corp.'s new Applied Research Laboratory (Raw Materials Division) in Monroeville, Pa. This unit handles batches up to 500 lbs. — is ideal for pilot work and small runs.



One of four 450 cu. ft. Sturtevant Blenders at Celriver Plant of Celanese Corp. (Rock Hill, N. C.). These large units handle up to 20,000 lbs. batches — have a 9-year record of meeting the most exacting blending requirements.

### Fully or semi-automatic, or manually controlled operation

Constructed of carbon steel, stainless steel or Monel metal, Sturtevant Rotary Blenders are engineered to fit each customer's needs — can be supplied with injector sprays and any desired control system.

For more on Sturtevant Blenders, request Bulletin No. 080B. (Bulletins also available on Mixers, Air Separators, Micronizers, Crushers and Grinders.) Write today. STURTEVANT MILL CO., 119 Clayton St., Boston, Mass.

Check 3446 opposite last page.

## INSTRUMENTS & LAB

try, have All-American quarterbacks calling the plays for best operation of today's processes!

The "in-process" computer can make more and more of the decisions for us. It can decide when it must simplify its own system or relinquish it entirely! Fortunately, computers are not emotional about doing so. Also, a computer always arrives at the same conclusion when given the same set of facts.

Such computers will take information from an operating unit, boil it down, and feed it back to the control loop. But doing only this is far different than performing the control job required on such complex units as fractionators or reactors. Here complicated calculations must be made on all of the variables as necessary, and the results of these fed back into the control loops. The operating hardware of computers capable of doing such jobs is now available.

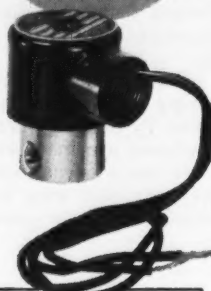
The real problem lies in getting mathematical statements of the process. Getting these may require months of system study by a group. If the whole process is studied, the cost involved may be as much as for the computer. Then, too, proper evaluation of process studies may take years, but competing companies cannot afford to wait too long for the results of their pioneering efforts. The pattern for computer control seems established, but we must use caution against promising too much too soon.

As to the question of economics between analog and digital computers, an analog unit that can solve one equation costs about \$2500. One that will solve  $n$  equations costs about  $n \times \$2500$ . On the other hand a digital computer which will solve 80 equations costs about \$80,000 — or \$1000 per equation!

Analog computers do not require any appreciable time in solving their equations, but digital machines do — up to five minutes to solve 80 equations.

Pneumatic computers have also been developed that are

## New...from MARSH!



Conduit-type Master-mite. Grommet-type also available.

### Small Solenoid Valves that fill a BIG Order

Designed to meet the need for positive-acting tight-seating valves for use on wide variety of media, including oxygen, hydrogen, acetylene, etc.

#### Two Types:

Conduit type and grommet type. Port sizes 1/8" and 1/4" NPT.

Ten orifice sizes: 3/64" through 1/4".

#### Wide range of voltages:

Standard with 115 V. A. C. but also available in 12, 24, 208, 230, 460 V. A. C.

#### Pressure to 540 psi.

Small, but with more strength in the Marsh manner. Coils never overheat. Entire assembly leak tight. Remarkably quiet operation. Cleanable without breaking connections. Used in any position. Bodies either brass bar stock or 18-8 stainless steel. All moving parts stainless. Underwriters' approved for use on oxygen and hydrogen and as safety valves.

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Division of Colorado Oil and Gas Corporation

Marsh Instrument & Valve Co., (Canada) Ltd., 8407 103rd St., Edmonton, Alberta, Canada, Houston Branch Plant, 1121 Rothwell St., Sect. 15, Houston, Texas.

Check 3447 opposite last page.

## Choose From The Widest Variety Of Thermocouple Wires

### Over 1500 Different Types



T-E's tremendous variety of thermocouple extension wires assures you quick delivery of every type and size—from one reliable source. Dependable quality control is also assured by T-E's own complete facilities for wire drawing, insulating and calibrating. T-E duplex wires come in solid or stranded construction, in all standard calibrations. The latest types of insulation and metallic armor overbraid protect them from all atmospheric, chemical and abrasive conditions. From 6 to 56 pairs of T-E thermocouple leads can now be installed at one time with the new "Thermo-Cable". Also available—a complete selection of "MIL" Spec Wire.

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In Canada:  
THERMO ELECTRIC (Canada) LTD.  
Brampton, Ont.

Check 3448 opposite last page.

CHEMICAL PROCESSING



very good and more economical than either of the electric systems. For simple equations, their application should always be considered.

The chemical process plant has been quite successfully operated for a long time without the use of computers for setting its controllers. This is particularly true of plants which have made good use of continuous process stream analyzers. Of course, instrumental analysis is needed to make computer operations practical. Beware, however, of computing a variable that can be measured!

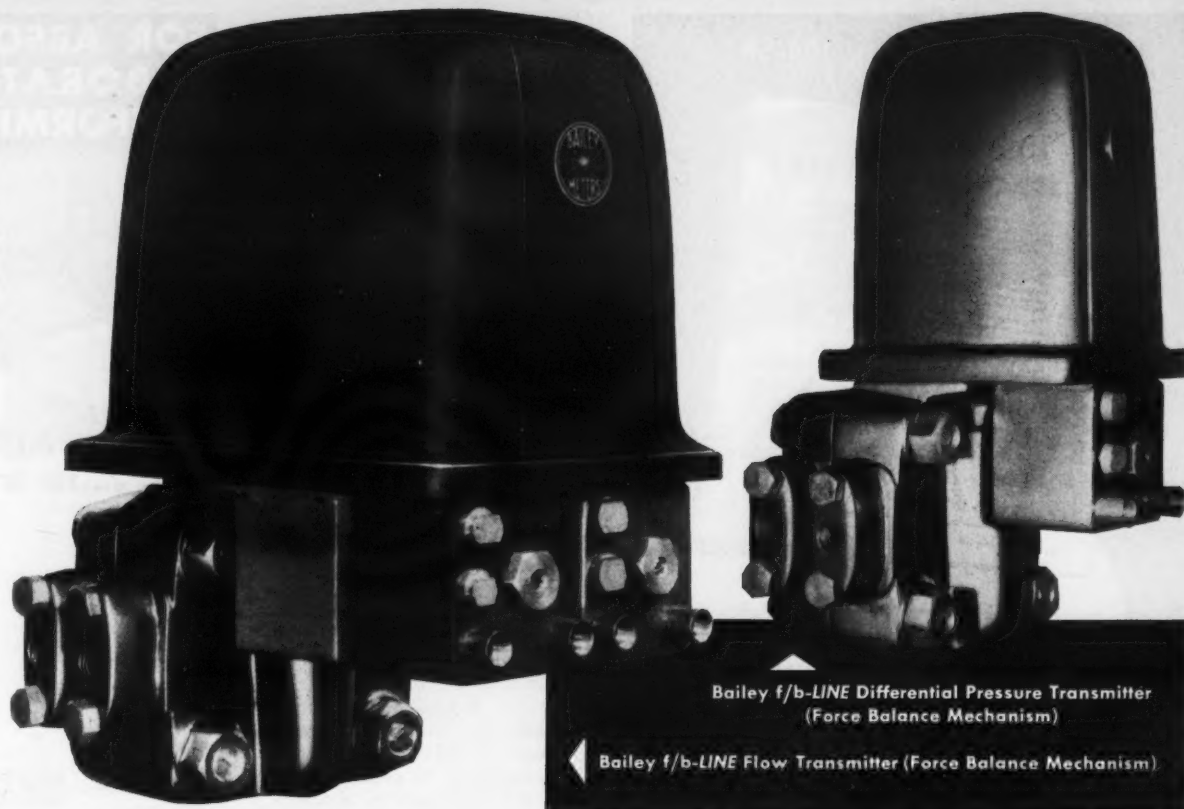
#### In The Future

For the next few years, computers will not replace the individual process variable controllers. They will gradually be used to provide intelligent settings for such controllers — that will assure best operation.

With plants coming along for the future, however, their processes will first be simulated mathematically on a computer using the same control system (with console) that will later be used on the plant. Compatibilities will be tested, equipment re-scaled as an aid to engineering and operations.

A chemical process has life and spirit. It is like a moving animal. In order for it to stay alive it must have a compatible nervous system. We have lived with the beast a long time — watched, studied, and experimented with it until we understand it. Due to its complexity we may not have the tools to analyze it completely. But we can furnish tranquilizers to improve its control system — such as analyzers, scanning systems, computers, and many other devices — for maximum performance and efficiency. For today, at least, this is "automation planning".

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.



## Two new Bailey *f/b-LINE* Transmitters permit new accuracy in measuring flow and differential pressure

Pneumatically transmits rate of flow—or differential pressure—measurements to indicating, recording, and/or controlling equipment at remote stations. Transmitters consist of a diaphragm measuring mechanism and a force balance pneumatic transmitting unit.

#### APPLICATION

For steam, water, air, gases and other fluids producing differentials across primary elements from 0-2 in. H<sub>2</sub>O to 0-2000 in. H<sub>2</sub>O at maximum service pressure of 50, 1500, and 5000 psig.

#### FEATURES

**Transmits a Signal Directly Proportional to Rate of Flow.** Uses receiver with uniformly-graduated chart or scale. Eliminates need for external square-root extractors or characterizers.

**10 to 1 Turndown.** Differential range of each diaphragm measuring element may be changed by factor of 10 to 1; e.g., 0-20 in. H<sub>2</sub>O diaphragm may also measure 0-2 in. H<sub>2</sub>O.

**Screwdriver Adjustments.** Range and zero adjustments readily accessible. Range may be changed with screwdriver adjustment.

**Overpressure Protection.** Protects against full service pressure applied to either side of diaphragm.

**Fast Response.** No viscous dampers needed, so speed of response is very fast.

**Corrosion Resistant.** For maximum differentials between 20 and 2000" H<sub>2</sub>O, all parts in contact with process fluid may be stainless steel. No sealing fluids or sealing diaphragm required.

**Good Stability.** Reset type boosters give good stability with high gain.

**Versatile Mounting.** May be mounted on process piping, wall, or separate mounting pipe using same bracket.

For additional information, call your local Bailey District Office, or write direct.

CP4-1

Chemical and petroleum division  
**BAILEY METER COMPANY**

1074 IVANHOE ROAD • CLEVELAND 10, OHIO

In Canada—Bailey Meter Company Limited, Montreal



Check 3449 opposite last page.



## CAMBRIDGE SURFACE PYROMETERS

In many industries close temperature tolerance demand constant accurate knowledge of the temperature of working surfaces. To meet this requirement, Cambridge Surface Pyrometers have proved indispensable to thousands of plants throughout the world.

Almost instantaneous in action, these accurate thermocouples instantly indicate the temperature of the hot and varied surfaces, still or moving, whether visible or in length or hard to reach. They show the surface temperature of mold cavities or of extrusion surfaces of almost any material. They measure the sub-surface temperature of materials in a plastic or semi-plastic state.

Cambridge Surface Pyrometers temperature accurate temperature. They are rugged and construction designed through years of experience. They are rugged, close study, possessing laboratory accuracy—high in weight and easy to use. They are on price satisfactory service after 30 years of constant use, improving quality and saving costs.



CAMBRIDGE INSTRUMENT COMPANY, INC.  
Pioneer Manufacturers of Precision Instruments  
Grand Central Terminal New York 17, N. Y.

Cambridge Surface Pyrometers are light weight, portable instruments—accurate but rugged—for measuring temperature of mold cavities and flat surfaces, drier, calender and mill rolls, and plastic batches and extrusions. Write for Bulletin 194-SR; 33 illustrations, many applications.

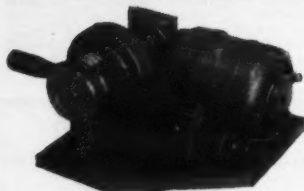
### CAMBRIDGE INSTRUMENT CO., INC.

3541 Grand Central Terminal, New York 17

PIONEER MANUFACTURERS OF PRECISION INSTRUMENTS

Check 3450 opposite last page.

## DCL metering pumps

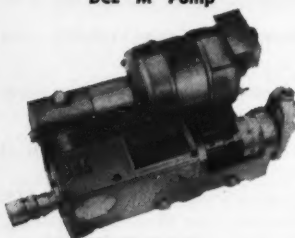


DCL Micro Pump

### MICRO PUMPS

For small constant flow. Adjustable by micrometer control of pump plunger stroke. 9 capacity ranges from 0.7 ccs/hr to 0.1500 ccs/hr.

DCL 'M' Pump



### 'M' PUMPS

Accurate metering pumps suitable for most liquids. Flow variations obtainable by micrometer adjustment of stroke. 10 capacity ranges from 0.0.19 gals/hr to 0.9.9 gals/hr.

Diaphragm or Piston type heads available  
full information is available on request

Territories Open For Stocking Dealers

## MARTON EQUIPMENT, INC.

BEVERLY, MASSACHUSETTS

Check 3451 opposite last page.

## INSTRUMENTS & LAB.

### Rapid-action sorptometer simplifies surface area measurement

Uses: Routine analyses of uniform samples of such as silica-alumina cracking catalysts. Chemisorption studies, of hydrogen on platinum. Examination of cosmetics, pigments, clays and ceramics, soils, powdered metals, fertilizers, and abrasives.

Features: Instrument is fast, accomplishing one-point comparison with a known standard in 10 minutes. Fragile and complicated glassware is eliminated with need for vacuum equipment. Unskilled personnel can operate unit which automatically affords permanent record of analysis.

Description: Known helium-nitrogen mixture is passed through a sample cooled by liquid nitrogen. Change in mixture's nitrogen concentration is measured by thermal conductivity detector and inscribed as peak on potentiometer recorder chart. A second peak is obtained by warming sample and measuring nitrogen released. Two peaks' areas are proportional to nitrogen adsorbed and desorbed. Simple calculation then affords required data.

(Model 212 Perkin-Elmer-Shell sorptometer is a product of Perkin-Elmer Corp., Norwalk, Conn.)

Check 3452 opposite last page.

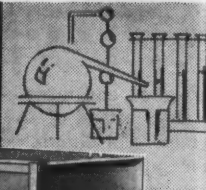
### Measures corrosive gas pressures to 50 psi

Uses: Measures corrosive and dynamic fluid or gas pressures such as liquid oxygen, strong alkalis and corrosive acids, such as fuming nitric acid, up to 50 psi.

Features: Strain gage operation produces linear response (resistance change) within one millisecond.

Range of operation is 0-50 psi. Pressure overload is three times full scale. Temperature limits range from -100 to +275°F. Section of device enclosing electrical elements is sealed against adverse ambi-

## FOR ABSOLUTE LABORATORY UNIFORMITY ...



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#### FOR MIXING:

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- Agricultural Chemicals
- Materials for the Plastics Industry
- Materials for Chemical Processing Plants
- Sweeping Compounds
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A uniform mix is assured time after time, no matter how complicated the formula, and with laboratory exactness. If the formula is right—the MARION MIXER will mix it with complete accuracy.

THE EXCLUSIVE MARION MIXING and BLENDING ACTION will handle any type of chemical materials and give a top quality mixed product at less cost.

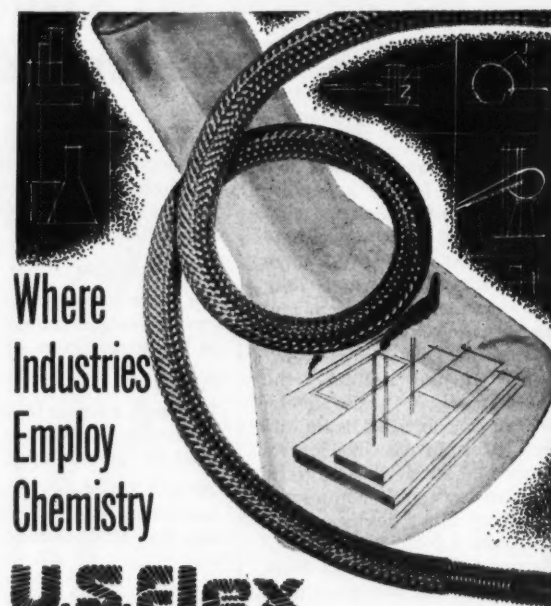
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Check 3454 opposite last page.

CHEMICAL PROCESSING

ent conditions such as fumes, water, humidity, low sensitivity to vibration. Pressure cavity easily disassembled for cleaning.

**Description:** Unit is totally enclosed and may be wall mounted. Pressure connection is at base. Electrical cable connection is at upper side.

Electrical sensing element consists of four SR-4 strain gages bonded to circumference forming four-arm wheatstone bridge. Short response time is made possible by extremely small volume-pressure cavity, frictionless operating parts and bonded strain-gage construction.

Unit can be factory-adjusted to match sensitivity of standard precalibrated indicators, recorders, and controllers. Either constant voltage or current system can be used.

(Model 227 Teledyne pressure transducer is product of Tabor Instrument Corp., North Tonawanda, New York.)

Check 3455 opposite last page.

#### NEW LITERATURE

Process Instrumentation  
and Laboratory Apparatus

Oxygen analyzer which incorporates several new features for obtaining and analyzing "cleaner" oxygen samples in furnace or boiler following combustion, is discussed in Data Sheet 463-188—Leeds & Northrup Company.

Check 3456 opposite last page.

Laboratory glassware (67 items) is featured in 40-page illustrated Supplement SP-57—Kimble Glass Company, subsidiary of Owens-Illinois.

Check 3457 opposite last page.

Scaler-analyzer, suitable for preset time and preset count gross counting of radiation is explained in 4-page RCLiac 128 Bul—Radiation Counter Laboratories, Inc.

Check 3458 opposite last page.

Instruments for scientific measurement, recording and testing are cataloged comprehensively in illustrated 48-page Cat G-10—Industrial Division, Minneapolis-Honeywell Regulator Company.

Check 3459 opposite last page.

# Exclusive!

## "SLIDE and HOOK" for easier installation

# NEW SPIN TOP ENCLOSURE

## FOR HAZARDOUS LOCATIONS

**DAMAGE-RESISTING** Acme thread. If you've struggled with "banged-up" threads, you'll appreciate this feature. It's always a breeze to put on and take off tanks for installation, inspection or maintenance.

**EASY TO ADD** pushbuttons or selector switches with easy-to-buy, easy-to-use "off-the-shelf" parts kits.

**STRONG and LIGHTWEIGHT**  
The complete enclosure is cast aluminum.

**REAL PROTECTION** against rain, dust, dirt and weather because male threads on collar section engage female threads on tank.

**INCREASED WIRING SPACE** and through-feed conduit entrances for horizontal tap-offs.

**EASY TO INSTALL** - "Slide and Hook" mounting arrangement takes the hard work out of the installation job. Diagram below shows how.

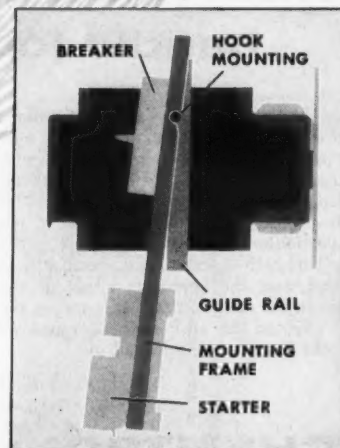
## 4 SIZES FOR STARTERS SIZE 0 THROUGH 5

CLASS I, GROUP C and D • CLASS II, GROUP E, F, and G

The new **SPIN TOP** enclosure is available from your Square D Distributor in three ways—complete device, enclosure only, or components only...for reversing and non-reversing across-the-line starters and combination starters. And for combination and non-combination two-speed starters.

*Write FOR BULLETIN 9990*

Square D Company, 4041 North Richards St., Milwaukee 12, Wis.



SLIDE and HOOK MOUNTING



# SQUARE D COMPANY

wherever electricity is distributed and controlled

Check 3460 opposite last page.



Highly corrosive elements in processing system at Chemical Contour plant in Gardena, California, cannot harm this all-Penton Chemtrol ball valve.

## CHEMTROL VALVES made from Penton\* handle jobs no metal can touch!

Another example of anti-corrosion jobs that Chemtrol valves do best is in the new process of chemical milling. In the heart of this processing system there's a Chemtrol ball valve now in operation for more than 10 months with no sign of failure. Installed in the drain line of a chemical milling tank, it's continually exposed to a 160°F solution of concentrated nitric and hydrochloric acids with dissolved chloride salts and oxides. This bath is formulated specifically to eat away stainless steel, and the corrosive effect of these hot acids is apparent in the metal fittings surrounding the valve. But they haven't affected this all-Penton Chemtrol valve. It still looks and works like new—inside and out.

Because of their resistance to corrosion and ability to withstand high working pressures and elevated temperatures, Chemtrol valves were supplied in Penton for this specific application. Chemtrol valves are also available in PVC Types I and II, Kralastic and polypropylene providing other desirable characteristics for specific uses.

Why not look to Chemtrol for the solution to your corrosion problems or for the transfer of liquids where complete purity must be maintained? For additional information, write today.

\*Penton is the Hercules registered trademark for chlorinated polyether.

### CHEMTROL

10872 Stanford Avenue  
Lynwood, California



Ball Valves



Check Valves



Globe Valves



Needle Valves



Cock Valves



Foot Valves



Dri-Seal No. 5 Pipe Thread  
Lubricant & Seal

PRINTED IN U.S.A.

Check 3461 opposite last page.

## INSTRUMENTS & LAB

**Recorders**, including specialized instruments, are presented along with complete buying information and specifications in 12-page Bul GEA-6933 — General Electric Company.

Check 3462 opposite last page.

**Radiation detectors** and other measuring instruments for research, industrial and medical applications are presented in Cat I-60 — Nuclear Measurements Corp.

Check 3463 opposite last page.

**Probes and accessories** for capacitance-type level control instruments are summarized in Tech Bul RF-5914—Aeronautical and Instrument Division, Robertshaw-Fulton Controls Company.

Check 3464 opposite last page.

**Laboratory balances** and scales are covered with pictures and complete data in Buls 1-1 and 3—Testing Machines, Inc.

Check 3465 opposite last page.

**Data loggers**, including model which permits entry of up to 14 digits simultaneously, are described in Bul 200—Datex Corporation.

Check 3466 opposite last page.

**Annunciator** which differentiates between component failure and alarm in system being protected, is described in Bul 108—Pan-alarm Division of Panellit, Inc.

Check 3467 opposite last page.

**Frequency meters** which employ tuned steel reeds as both measuring and indicating elements are introduced with illustrations and data in Bul 32—James G. Biddle Co.

Check 3468 opposite last page.

**Flow indicator** and alarm for purge type service is explained in Spec Sheet DS-130-1—Brooks Rotameter Company.

Check 3469 opposite last page.

**Insulators** for sheathed thermocouples are reviewed in revised Thermocouple Insulators Bul—Norton Company.

Check 3470 opposite last page.

**Torsion dial balance**, photo-hemoglobinometer and explosion-proof chromatograph are among new items featured in 37th edition of "What's New for the Laboratory"—Scientific Glass Apparatus Co., Inc.

Check 3471 opposite last page.



Weston gave industry  
the first dependable bi-metal  
thermometer . . .

and  
**WESTON**  
KEEPS  
GIVING  
INDUSTRY *more*  
IN BIMETALS



Yes, Weston gives you more: the broadest line—from which you can choose thermometers exactly suited to your process . . . more of the features you want — for convenience, readability, accuracy and long service . . . more quality—in the famous Weston tradition of fine craftsmanship.

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**WESTON**



*Bi-metal Thermometers*

WORLD LEADER IN MEASUREMENT AND CONTROL

Check 3472 opposite last page.

FEBRUARY 1960

## INSTRUMENTS & LAB

Control valves are described and illustrated with cross-sectional diagrams in Magnatrol Cat—Engineering Department, Magnatrol Valve Company.

Check 3473 opposite last page.

Pyrometer indicators which feature readability and minimum size are pictured and specified in Buls 0031 and 0032—Atlantic Pyrometers, Inc.

Check 3474 opposite last page.

Controller for regulating concentration of caustic, acidic or aqueous solutions in variety of situations is described in 4-page EMC Bul—Electro Mechanisms Corporation.

Check 3475 opposite last page.

Density gage for processing applications with 4 to 14" pipe is subject of 2-page Bul LSG—The Ohmart Corporation.

Check 3476 opposite last page.

Digital tape handlers are introduced in 8-page Bul FR-400—Instrumentation Division, Ampex Corporation.

Check 3477 opposite last page.

Crucibles fabricated of beryllium oxide for use in melting ultra high purity or reactive metals are presented in Beryloco Tech Sheet—The Beryllium Corporation.

Check 3478 opposite last page.

Logic switches suited for use in large and small data systems, computers and less complicated systems are explained in Form LS-2-859—Tally Register Corporation.

Check 3479 opposite last page.

Compiler with which any problem may be submitted to computer in simple algebraic form, is described in 18-page Manual S-520—Data Processing Division, Royal McBee Corporation.

Check 3480 opposite last page.

Sensing control which electronically detects, counts, measures and recognizes objects entering capacity field, is covered in 2-page Bul 400—Security Controls, Inc.

Check 3481 opposite last page.

Laboratory equipment is listed in 112-page catalog which contains specifications for more than 300 exclusive products used in the physical sciences. Catalog may be obtained upon letterhead request to The Ealing Corporation, 40 University Rd., Cambridge, Mass.

As **SIMPLE** and  
Dependable  
as the Pull of a  
**MAGNET!**



**The Simplest, Most Versatile  
LIQUID LEVEL CONTROL  
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Linked to liquid level by infallible magnetic force, Magnatrol is free from the limitations inherent in mechanical or electrical controls. With the actuating magnet rated at 98% of initial strength after 30 years, Magnatrol has *infinite operating life*, with practically no maintenance at all. There are no wearing parts to get out of order.

What's more, Magnatrol's simple operating principle permits easy, economical modification of standard units to meet *any* pressure, temperature or corrosion requirements. That's why there's practically no limit to Magnatrol's use. It's also why "specials" are likely to be standard with us. Magnatrol units control level changes from .0025-in. to 150-ft.—with single or multi-stage switching.

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Check 3482 opposite last page.

With first petrochemicals program totaling more than \$228 million investment being completed in 1959, plans for \$150 to \$170 million more to be spent for plants are made as —

# Japan Launches Second Petrochemicals Program, Boosts Investment To \$400 Million

**TADAYOSHI KITAMURA, President**  
Asahi-Dow Limited, Tokyo, Japan



Mr. Kitamura became the first president of Asahi-Dow Limited, a company jointly owned by Asahi Chemical Industry Co., Ltd. and The Dow Chemical Company, when it was founded in 1952. Previous to that he had managerial positions at several rayon, petroleum, fertilizer and chemical companies. Mr. Kitamura's academic training includes a degree in engineering from Kyushu University and a year of graduate study in Germany.

Japan has almost completed its first petrochemicals program and has started forming the second program. With the rapid strides being taken by this petrochemical development, domestic supplies of such products as polyethylene, ethylene oxide, ethylene glycol and styrene are becoming possible. Up to recently, all of these materials were imported.

This domestic petrochemical production will effect a savings in foreign currency of about \$110 million per year. On the other hand, imports of petroleum and other raw materials and payment of royalties for foreign patents and know-how will increase.

Table II shows the capital invested on a number of petrochemicals under the first program. Total amounts to \$228 million. This does not include additional capital spent for plants to make petrochemicals for fertilizer applications, such as ammonia, urea and ammonium sulfate. Methanol, carbon black and acrylonitrile are also not included in the \$228 million figure. These last six products are shown, along with others, in Table I listing the plants and furnishers of techniques. Nitric acid is not shown in either table. Hence, Japan has probably already spent more than \$300 million for petrochemical plants.

The Japanese Government and private industries are now

studying what direction the second petrochemicals program will take. It is certain that such products as acetylene, butyl alcohol, octyl alcohol, alkyl benzene, propylene glycol and polypropylene will be manufactured. Polypropylene is now receiving the concentrated attention of several companies. Total capital planned for facilities to produce these new items will be \$150-170 million.

Additional funds will also undoubtedly be allocated for expansion of petrochemicals for fertilizers. Those companies now manufacturing ammonia by electrolysis or from coal or coke are now eager to shift the raw material to natural gas, petroleum or off-gas in order to cut production costs.

## Location of Plants

Three areas predominate in production of petrochemicals in Japan. One of these is Kawasaki, facing Tokyo Harbor. About eight petrochemical plants are located here, centering around Nippon Petroleum Company and Nippon Petrochemical Company.

A second petrochemical zone is located at Yokkaichi in the middle of Japan's main island, Honshu. Mitsubishi Petrochemical Company and Japan Synthetic Rubber are located here. The Japanese Government has a one half interest in Japan Synthetic

**TABLE I**  
**Plants and Products — First Petrochemicals Program**

Name of Company	Location	Product	Production in Millions of lb/yr	Date on Stream	Furnisher of Techniques
Akita Petrochemicals	Akita	Methanol	68	June 1958	Grande Paroisse
		Methanol	106	(June 1960)	Sumitomo Chemical
Asahi Chemical Industry	Nobeoka	Ammonia	36	(Jan. 1960)	Texaco Development Chemical Construction Corporation
Asahi-Dow	Kawasaki	Styrene monomer	40	Oct. 1959	Dow Chemical
		Polystyrene	18	May 1958	Dow Chemical
Asahi Glass	Chiba	Ammonia	79	Oct. 1959	Chemical Construction Corporation
Befu Chemical	Kakogawa	Ammonia	73	Oct. 1958	Texaco Development Chemical Construction Corporation
		Urea	77	Oct. 1958	Montecatini
Furukawa Petrochemical	Kawasaki	Polyethylene	20	May 1959	Standard Oil, Indiana
Japan Catalytic	Kawasaki	Ethylene oxide	4	May 1959	Blaw-Knox
		Ethylene glycol	8	May 1959	Own technique
Japan Gas Chemical Industries	Niigata	Methanol	29	April 1957	Chemical Construction Corporation
		Methanol	145		
		Urea	120	May 1957	Chemical Construction Corporation
		Ammonium sulfate	330		
		Methanol	132	Sept. 1952	Own technique
		Carbon black	2		
Japan Geon Co.	Kawasaki	SB rubber	13	May 1959	Goodrich Chemical
		High-styrene rubber	3	May 1959	Goodrich Chemical
Japan Synthetic Rubber	Yokkaichi	NB rubber	3	May 1959	Goodrich Chemical
		SB rubber	99	Sept. 1959	Blaw-Knox, Houdry
					Esso Research
					Goodyear
Kyowa Hakko Kogyo	Ube	Ammonia	99	Nov. 1956	Montecatini
		Urea	75	Nov. 1956	Montecatini
		Ammonium sulfate	120	Nov. 1956	Montecatini

Name of Company	Location	Product	Production in Millions of lb/yr	Date on Stream	Furnisher of Techniques
Maruzen Oil	Shimotsu	Secondary butanol	5	Feb. 1957	
		Methyl ethyl ketone	4	Dec. 1957	
	Maysuyama	Benzene	13	Dec. 1958	Universal Oil Products
		Toluene	8	Dec. 1958	Universal Oil Products
		Xylene	8	Dec. 1958	Universal Oil Products
		Benzoic acid	2	Oct. 1959	Scientific Design
		Phthalic anhydride	4	Oct. 1959	Scientific Design
		Isophthalic acid	11	Oct. 1959	Scientific Design
		Terephthalic acid	5	Oct. 1959	Scientific Design
Mitsubishi-Monsanto Chemical	Yokkaichi	Polystyrene	13	Oct. 1958	Monsanto
Mitsubishi Petrochemical	Yokkaichi	(Ethylene)	48	March 1959	Stone & Webster
		Polyethylene	22	March 1959	B.A.S.F.
		Styrene monomer	40	March 1959	B.P.M. (Shell)
		Ethylene oxide	7	Sept. 1959	Scientific Design
		Ethylene glycol	7	Sept. 1959	Scientific Design
Mitsubishi Petroleum	Yokkaichi	Benzene	10	Dec. 1957	Universal Oil Products
		Toluene	8	Dec. 1957	Universal Oil Products
		Xylene	7	Dec. 1957	Universal Oil Products
Mitsui Petrochemical (Koa Petroleum)	Iwakuni	(Ethylene)	44	Feb. 1958	Stone & Webster
		Polyethylene	26	Feb. 1958	Ziegler
		Ethylene oxide	5	Feb. 1958	Scientific Design
		Ethylene glycol	11	Feb. 1958	Scientific Design
		Phenol	26	June 1958	Scientific Design
					Distillers
		Acetone	15	June 1958	Stone & Webster
		Benzene	19	Jan. 1958	Universal Oil Products
		Toluene	25	Jan. 1958	Universal Oil Products
		Xylene	25	Jan. 1958	Universal Oil Products
Nihon Suiso Nippon Petrochemical	Onahama Kawasaki	Ammonia	44	June 1958	Koppers Company
		Isopropyl alcohol	4	May 1957	Stone & Webster
		Acetone	8	May 1957	Distillers
		Ethylene	55	April 1959	Stone & Webster
		Butadiene	11	May 1959	Esso Research
Nissan Chemical Industries	Toyama	Ammonia	99	Sept. 1955	Montecatini
		Urea	88	April 1954	Montecatini
Nitto Chemical Industry	Hachinohe	Ammonia	99	(March 1960)	Texaco Development
Shin Nippon Chisso Hiryo	Minamata	Ammonia	42	April 1957	Tears Engineers
Showa Denko	Kawasaki	Ammonia	79	April 1959	Montecatini
					Texaco Development
Showa Petrochemical	Kawasaki	Ammonia	86	(Jan. 1960)	Ishikawajima-Foster
		Urea	176	Mar. 1959	Wheeler
		Polyethylene	22	May 1959	Montecatini
					Toyoko Koatsu Ind.
Sumitomo Chemical (Idemitsu Kosan)	Niihama	(Ethylene)	26	April 1958	Phillips Chemical
Sumitomo Chemical	Niihama	Polyethylene	24	April 1958	C. F. Braun
		Ammonia	73	April 1958	Stone & Webster
		Ammonia	77	Aug. 1959	Imperial Chem. Ind.
		Urea	145	July 1952	Grande Paroisse
Tohoku Hiryo	Akita	Ammonia	75	Sept. 1958	Chemical Construction Corporation
					Montecatini
					Montecatini
Tokai Ammonium Sulfate Industry	Yokkaichi	Ammonia	48	Dec. 1955	
Toyo Gas Chemical Industry	Niigata	Ammonia	77	May 1958	Grande Paroisse
		Urea	126	May 1958	Toyoko Koatsu Ind.
		Ammonium sulfate	159		
Toyo Koatsu Industries	Chiba	Ammonia	81	July 1958	Grande Paroisse
		Urea	145	July 1958	Own technique
		Ammonium sulfate	23		
		Methanol	42	Feb. 1958	Montecatini
		Methanol	77	(June 1960)	Own technique
Ube Industries	Ube	Acrylonitrile	4	July 1958	
		Ammonia	121	(April 1960)	Texaco Development
					Montecatini
		Urea	106	Oct. 1957	Chemical Construction Corporation
					Montecatini



Asahi-Dow Kawasaki plant

Rubber. These two companies obtain their raw materials from Showa Yokkaichi Sekiyn Company.

The third petrochemical zone is at Iwakuni, in the western part of Japan's main island. Mitsui Petrochemical is in production here, acquiring raw materials from Koa Petroleum Company. A feature of this center is that one company has a well-coordinated operation.

#### Petrochemical Prices

Problems still remain for Japanese petrochemicals in their relation to international prices. Prices have come down. From May 1956 to December 1958, ethylene oxide dropped from 46c/lb to 35c — polyethylene from 55c to 40c — and acetone from 18c to 17c. Although prices are still

generally higher on petrochemicals made in Japan than they are internationally, it is believed that prices will continue to drop as production expands.

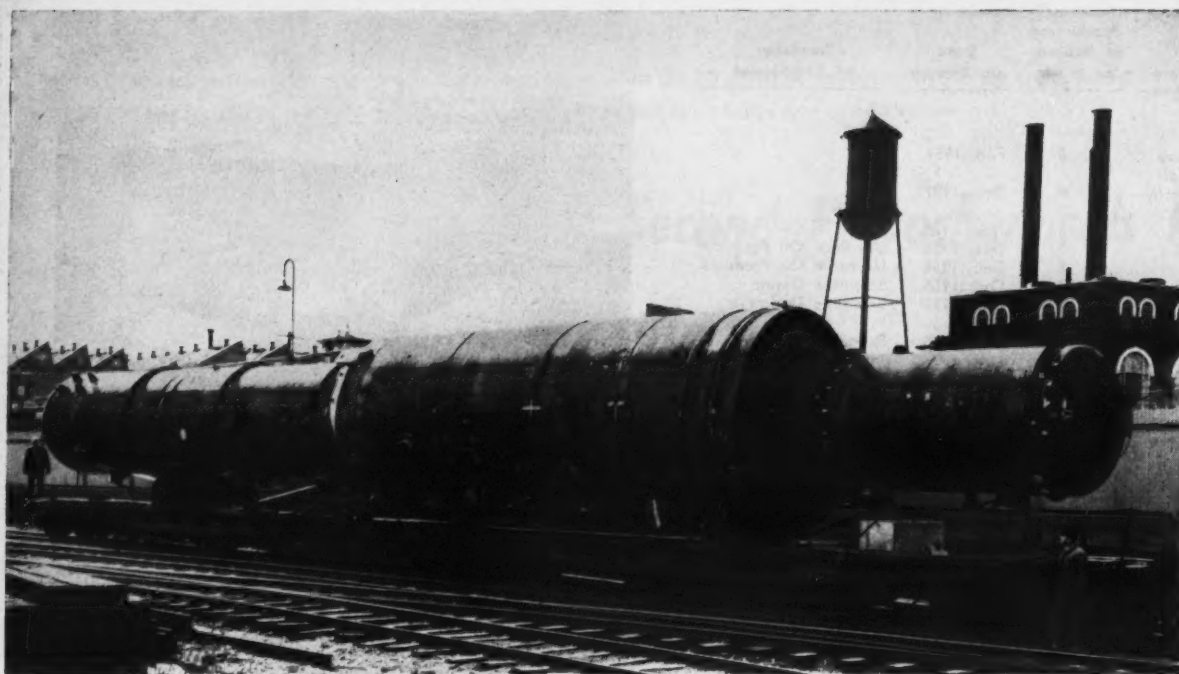
#### Future

In the future, plans will be made for these larger production volumes. Petrochemicals must also be coordinated with chemicals, petroleum refining, and the tar and fermentation industries. Progress has been good to date and it is believed that the future of petrochemicals in Japan is very bright. As shown in Table I, American chemical and engineering companies have taken an important part in the development of Japanese petrochemicals so far and will undoubtedly play a major role in the future.

**TABLE II**  
**Capital Invested — First Petrochemicals Program**

Product	Capacity in Millions of lb/yr	Invested Capital in Millions of Dollars
Ethylene	196	\$ 34
Polyethylene	114	63
Ethylene oxide	15	9
Ethylene glycol	26	5
Styrene monomer	79	11
Polystyrene	31	3
Benzene	43	
Toluene	45	26
Xylene	52	
Isopropyl alcohol	9	7
Phenol	26	
Acetone	25	10
Synthetic rubber	118	49
Terephthalic acid	18	11
		<b>\$228</b>



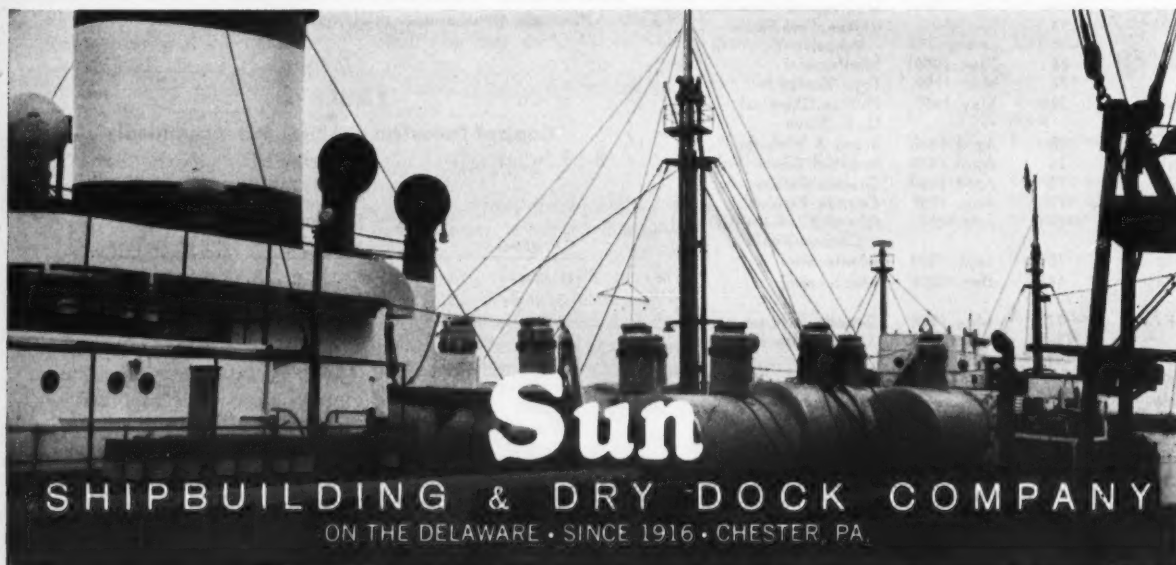


# VERSATILITY

## SOLVES PROBLEMS IN SHIPPING PROCEDURE

The variety of large-size work which Sun Ship's shops produce is matched by a variety of equally important shipping problems. Sun's facilities for shipping by water (overseas, coastal, or inland)—directly from our plant, are often the most economical available, and when large pressure vessels, such as those shown here, are scheduled for overseas shipment, direct, plant-to-ship loading saves additional time and expense.

Inland customers benefit from our ability to pre-check clearances and schedule shipments by rail or truck before production ever begins, so that delivery on schedule . . . on budget . . . is assured. Thus VERSATILITY . . . which has been made a "standard procedure" through Sun's experience . . . is extended through one more avenue . . . Shipping Procedure.



**Sun**

SHIPBUILDING & DRY DOCK COMPANY

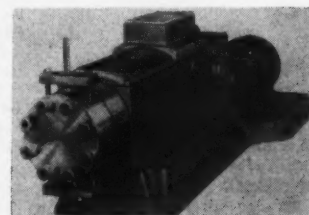
ON THE DELAWARE • SINCE 1916 • CHESTER, PA.

Check 3483 opposite last page.

## PETROCHEMICALS

### Pump feeds chemicals at 3200 psig

**Uses:** Originally designed for feedwater treatment, pump is finding wide usage in petrochemical and allied fields.



Meters chemicals with high degree of accuracy

**Features:** Unit is capable of pumping 9.4 gph at pressures to 3200 psig.

**Description:** Positive-displacement pump has a  $\frac{1}{2}$ " piston. It can inject feedwater chemicals into boilers under high pressure with accuracy and reliability.

(Model CPS-4 pump is product of Process Equipment Division, Lapp Insulator Company, Inc., 108 Hall Street, Le Roy, N.Y.)

Check 3484 opposite last page.

### Viton O-rings seal at 500°F

**Uses:** O-rings are especially suited for sealing in the petroleum and petrochemical fields.

**Features:** Seals will operate in temperatures to 500°F and even higher on an intermittent basis. O-rings do not swell in the presence of most petroleum-based products. They even maintain desirable sealing in presence of aromatics.

**Description:** O-rings are based primarily on Du Pont Viton. They have good resistance to compression set, high tensile strength, exceptional tear resistance, and good ozone resistance. Special as well as standard shapes and sizes are available.

(SR270-70 O-rings are product of Stillman Rubber Company, 5811 Marilyn Ave., Culver City, Calif.)

Check 3485 opposite last page.

## Prevents air pollution at Texaco nitric acid plant

**Catalytic decomposition  
system changes effluent  
to a colorless gas**

- helps to maintain good community relations
- makes plant safer by avoiding contamination of air plant

GORDON WEYERMULLER, Petrochemical Editor

**Problem:** When Texaco was planning a 200-ton/day nitric acid unit, plant wished to avoid  $\text{NO}_2$  fumes for two reasons.

One, plant wanted to maintain good relations with neighboring Lockport. Two, company operates an ammonia unit nearby which employs low-temperature equipment to separate components of air. To maintain complete safety, prevention of possible contamination of this air plant was necessary.

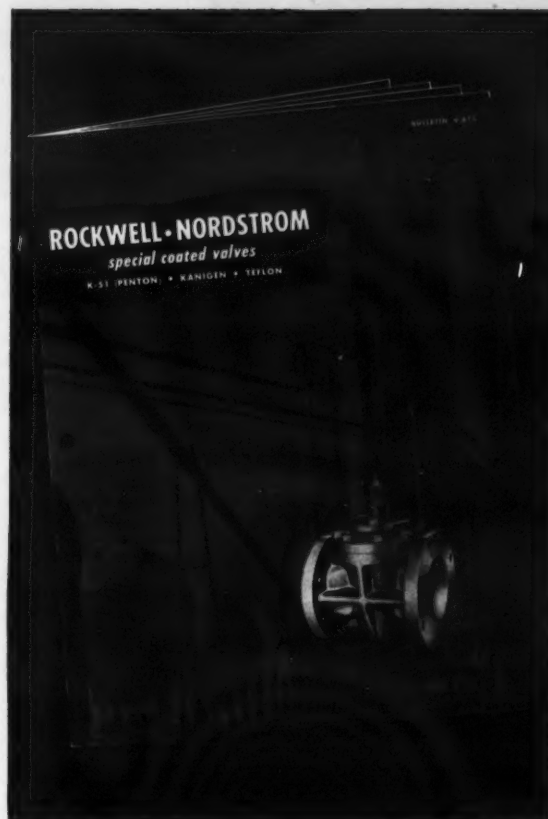
**Solution:** Texaco incorporated a catalytic decomposition system, when nitric acid plant was being designed, to eliminate  $\text{NO}_2$  fumes. Here is how system operates:

Overhead from absorber tower in nitric acid plant contains 2000-3000 ppm  $\text{NO}_2$ . This gas is heated to 900°F in an exchanger by effluent from converter.

This overhead gas is mixed with fuel gas from ammonia plant. Fuel gas contains a high percentage of hydrogen and

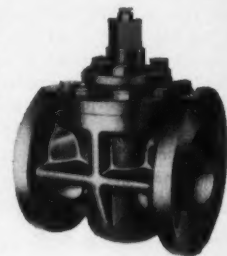


Flat-bed catalyst basket used in fume removal unit



### Get this NEW BOOKLET on ROCKWELL-NORDSTROM Valves with Teflon Coated Plugs

Rockwell-Nordstrom standard pattern valves with Teflon coated plugs are now available for use where infrequent or inadequate plug valve lubrication might be expected. The coating of tough Teflon gives added lubricity to the plug for longer valve life and easier operation. For complete information on Teflon, as well as corrosion resisting K-51 (Penton) and Kanigen coatings, write for the new booklet on special coated valves to: Rockwell Manufacturing Co., Pittsburgh 8, Pa. Canadian Valve Licensee: Peacock Brothers Limited.



ROCKWELL-Nordstrom VALVES

another fine product by

**ROCKWELL**



Check 3486 opposite last page.



# big ONE PIECE TEFLON GASKETS

*Custom made to  
your specifications*

An exclusive Dore' quality control technique enables us to pressure fuse solid Teflon Gaskets in any diameter, flange width and thickness. You are not restricted to the 48" O. D. gaskets cut from flat sheets of Teflon or required to dovetail or overlap several segments when larger gaskets are necessary. You can now get one piece gaskets in 7', 8', 12' and larger diameters, with flange width and thickness as required. All tolerances on these gaskets are closer than on those cut or stamped from flat Teflon sheets. The pressure fused joints are as smooth and strong as the original molded Teflon. Considerable savings can be made on fused gaskets under 48" as compared to gaskets cut from sheet.

In addition to plain round styles, these "Big" gaskets are available with cross members in any pattern. Send us drawings or description of your "Big" Teflon gasket requirements for specific recommendations and quotations.

Write for Bulletin A-59.



*John L. Dore' Co.*

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Export: 1505 Race St. • Philadelphia 7, Pa. U.S.A.  
Cable Address: DOREX

Check 3487 opposite last page.

## PETROCHEMICALS

its use makes operation more economical.

Gas to be decomposed should contain about 2-3% O<sub>2</sub>. This O<sub>2</sub> is introduced into absorber, also acting as a bleaching agent to give good color to the acid.

Gas is introduced into catalyst chamber where decomposition takes place. Catalyst is in form of a basket and consists of nichrome ribbons coated with precious metals. Gas reaches temperature of 1400-1600°F at this point. NO<sub>2</sub> is decomposed to N<sub>2</sub> and O<sub>2</sub>, the oxygen being changed to CO<sub>2</sub> and H<sub>2</sub>O.

After passing through catalyst chamber, hot gas enters boiler and generates 225-psi steam. Catalyst chamber and boiler are enclosed in one small vessel. See photograph.

Tail gas from boiler at 650-950°F goes through Brown-Boveri expander for power recovery. Gas is then vented to atmosphere through 50' stack.

**Results:** Effluent from stack is colorless, the 2000-3000 ppm of NO<sub>2</sub> having been reduced to less than 200 ppm. Community relations are excellent. Present plans call for increasing height of stack to provide even less possibility of contaminating air plant.

(Nitric acid plant was designed and built by The Chemical and Industrial Corp., Cincinnati 26, Ohio.)

Check 3488 opposite last page.

(Catalyst basket is product of Catalytic Combustion Corp., 4725 Fourteenth St., Detroit 8, Michigan.)

Check 3489 opposite last page.

### Materials in compressors varied to fit needs of applications

**Uses:** Low-flow/high-pressure ratio centrifugal-compressor applications.

**Features:** Cast casing and forged impeller element may be made of materials to fit application needs. Special bearing housings and seal designs permit lubrication with water or other lubricants, and avoid explosion hazards caused by

# NOW *Allflex* "MNH" FLEXIBLE CONNECTORS

FROM STOCK  
FOR FASTEST  
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• BRONZE  
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1/4" 1" 3/8" 1-1/4" 1/2" 1-1/2" 3/4" 2"

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12" 18" 24" 30" 36" 48" 60" 6Ft. 8Ft. 10Ft. 12Ft. 15Ft.

... also available in all standard sizes, in any required length, with any standard or special fitting or flange.

ALLFLEX Standard "MNH" Flexible Connectors are sold through leading Industrial Distributors. If not available locally—THEY CAN BE SHIPPED FROM FACTORY SAME DAY ORDER IS RECEIVED.

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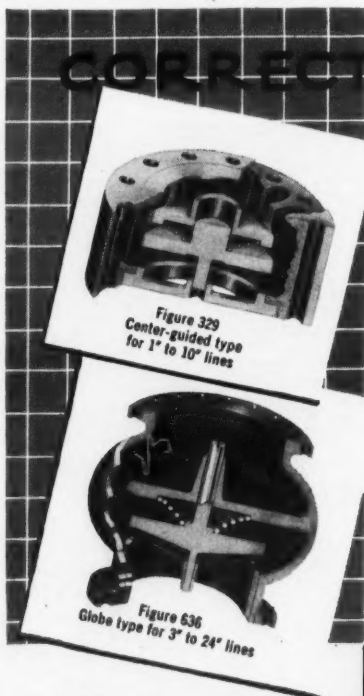
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Check 3490 opposite last page.



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## CORRECT DESIGN...

### FOR SURE SURGE-PRESSURE PROTECTION

By closing instantly whenever flow reversal starts, or when flow is zero — these valves assure protection for piping, pumps and other components. Silent in operation, built of material to meet any service, usable in any position. Write for Bulletins: No. 654 on Valves; No. 851 on Cause, Effect and Control of Water Hammer.

Williams-Hager

*Silent*  
CHECK VALVES

Check 3491 opposite last page.

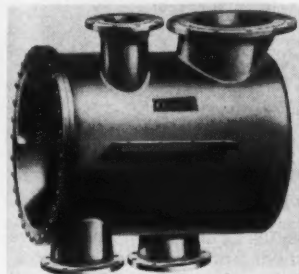
CHEMICAL PROCESSING



## PETROCHEMICALS

oil contamination or toxic gas leakage.

**Description:** Compressors in line are available in both single- and two-stage designs which may be adapted to han-



Two-stage compressor features flexibility in materials of construction

dle gases other than air. Foundation needed is simple and inexpensive.

Capacities range from 800 to 8000 cfm, and pressures up to 1000 psia.

Units are lightweight, require little space, and provide oil-free air, according to manufacturer.

(Type R compressor line is development of Compressor Department, Elliott Company, Division of Carrier Corporation, Jeannette, Pa.)

Check 3492 opposite last page.

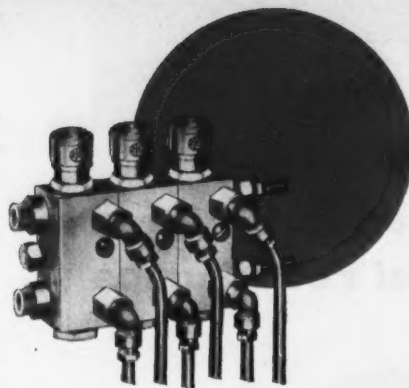
### First Butamer unit on stream

World's first commercial Butamer unit for conversion of normal butane to isobutane recently started up at the Standard Oil Company of California plant at Richmond, California.

Butamer unit is integrated with a new alkylation plant. Both units share the same deisobutanizer column. High concentrations of isobutane in the effluent from the Butamer process, about 60% for each pass of normal butane, are attributed to a recently developed platinum-containing catalyst.

(Butamer process is licensed by Universal Oil Products Company, 30 Alonquin Road, Des Plaines, Ill.)

Check 3493 opposite last page.



**Type II Accumatic Valves** are fully automatic. Completely sealed for *clean* lubrication of power shovels, cement kilns, conveyors—any indoor or outdoor installation. For all fluid oils and most lighter greases. Available in four sizes to fit a wide range of applications.



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An Accumatic Centralized Lubrication System delivers measured amounts of lubricants at proper intervals, to provide a better lubricant film on all bearing surfaces. Assures completely accurate lubrication, *even while machine is in operation*, with no interruption in production. Reduces lubricant consumption and prolongs service life of each bearing. Machines with many bearings or dangerously located bearings are lubricated from one central point . . . vital high-precision machines receive proper lubrication at all times.



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Check 3494 opposite last page.

# NEW

## American 200 Series Chemical Feed Pumps



- METERING ACCURACY OF  $\pm 1\%$
- CAPACITY TO 1624 GPH.

New 200 Series Simplex model can pump up to 812 gph. Duplex model has double this capacity. Maximum pressure of 10,000 psi.

Easy, inexpensive operation is assured by these quality features:

- Self-contained lubrication system — no downtime for lubrication.
- E-Z Clean Cartridge Valves simplify maintenance.
- Interchangeable liquid ends for greatest adaptability in the field.
- Precision screw adjustment on crank for easy accurate stroke regulation.
- Sealed Self-aligning bearings on crank and crosshead withstand greater radial and axial thrust loads.
- Crossheads of hardened and ground steel ride on cast iron.
- Heavy duty reducers.
- NEMA frame motors.

Precision built 200 Series pumps handle a wide variety of "tough," corrosive materials. In Chemical Processing, Refining and Boiler Feed operations, the pumps assure highest accuracy in feeding precisely metered fluids in virtually all ratios, with flow, temperature, pressure, conductivity, PH and other controlled process variables.

Write today for more information.

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Check 3495 opposite last page.

## PETROCHEMICALS

**Multi-stage compressor designed for minimum wear on seals**

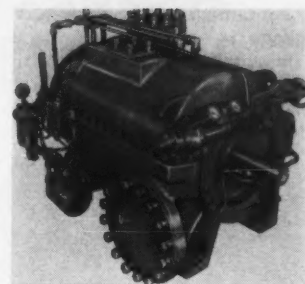
Compact, centrifugal unit has 400 fewer parts

**Uses:** For gas compression applications including fractionation, liquefaction, chemical reaction, storage and refrigeration.

**Features:** Shaft design combines extra stiffness for minimum deflection and vibration in rotor areas. Small diameter at sealing and coupling end reduces sealing area and results in less wear on seals.

**Description:** Multi-stage turbo compressor is available with two to eight wheels in a single casing. Compression ranges up to 20, and more, are possible with gases in density range of fluorocarbon refrigerants. Tandem arrangement provides heavy side load capacity, external gas cooling and additional stages. Interstage connections are provided for intercooling, for cool gas or liquid injection or for interstage bleed.

Three casing sizes, three



Multi-stage centrifugal compressor for air, process gases and refrigeration

casing materials and three wheel materials are available. Casing sizes are 26, 38, and 55". Casing materials include cast iron, nodular iron and cast steel. Aluminum alloy, alloy steel and stainless impeller wheels can be furnished. Maximum operating pressures up to 700 psig are provided. Operating temperatures range up to 600°F. Unit has 400 fewer parts than conventional units.

(Turbomaster compressors are product of York Corporation, subs. of Borg-Warner Corporation, York, Pa.)

Check 3496 opposite last page.



-ALI-

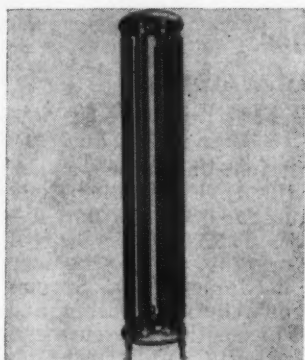
**Finned tank heater  
keeps contents  
moving**

Eliminates stratification  
or sedimentation

**Uses:** For heating bulk stor-  
age tanks.

**Features:** Vertical design  
sets up thermal siphon that  
keeps tank contents moving,  
preventing stratification or  
sedimentation.

**Description:** Heavy-duty  
tank heater has fins 1" high,  
providing 295 sq ft of heating  
surface. Coils provide good



Vertical tank heater is elevated  
off floor, making tank cleaning  
easier

steam distribution, adequate  
drainage of condensate and  
have high corrosion allow-  
ances. Unit is manufactured of  
carbon steel or various alloys.

(TFS-8 tank heater is product  
of Brown Fintube Company,  
518 Huron Street, Elyria, O.)

Check 3497 opposite last page.

**Petroleum process  
removes sulfur  
from gasoline**

Recently developed Merox  
process provides an inexpen-  
sive way to remove harmful  
sulfur compounds from gaso-  
line and light distillate oils.  
An important application of  
process will be for jet fuels.

(Merox process is develop-  
ment of Universal Oil Pro-  
ducts Company, 30 Algonquin  
Rd., Des Plaines, Ill.)

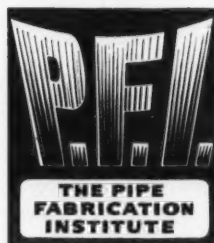
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**"But officer, we were only hurrying  
to pick up his P.F.I. STANDARDS!"**

**SEND COUPON BELOW FOR  
THESE P.F.I. STANDARDS**

- 1 Machining Backing Rings for Butt Welds
- 2 Dimensioning Welded Assemblies
- 3 Linear Tolerances Bending Radii
- 4 Shop Hydrostatic Testing
- 5 Cleaning Fabricated Piping
- 6 Built-up Weld, Metal Bosses
- 7 Welded Nozzles—Spacing
- 8 Preheat-Postheat Before, After Welding
- 9 Arc-Welding Dissimilar Ferritic Steels
- 10 Stress Relieving Practices
- 11 Affixing Permanent Symbols to Piping



The traffic officer could be more sympathetic, but he's  
heard all kinds of "fabrications" . . . unfortunately, he  
doesn't understand the many problems of pipe  
fabrication or he would know all about the value of  
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These P.F.I. Standards are packed with vital data on the  
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and high temperature piping used by all industry.  
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real assurance of meeting the most exacting requirements  
of piping, whether it's welded, bent, coiled or vanstoned  
. . . in any metal as a component or a complete assembly.  
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coupon below which ones could be helpful to you.

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Check 3499 opposite last page.





**FORGED STEEL VALVE**  
FOR CHEMICAL & PETROCHEMICAL PLANTS



ORBIT VALVES installed as "stop" valves in a compressor installation at a large natural gasoline plant in Texas. Compressor is driven with rich oil from four absorbers.

The Orbit Valve's positive closure and non-lubricated feature is ideal for use with pressure regulators, meters, reflux pumps, compressors and similar equipment in areas where repairs must be carried out from time to time. Wherever Orbit Valves are installed, you are assured a safe atmosphere for dismantling equipment and do not have to worry about valve leakage that could create a hazardous working area.

**SIZES:** 1", 1½", 2½", 3" and 4" ASA 300-lb. through 2500-lb. full opening flanged and screwed ends. Venturi opening available in sizes: 2", 2½", 3", 4" and 6" ASA 150-lb. through 2500-lb. flanged ends only.

**SOURCE:** Through your favorite industrial supply house.

**LITERATURE:** Write Department B for Catalog 58-B.

## ORBIT VALVE COMPANY

P. O. BOX 699, TULSA, OKLAHOMA  
PHONE LUTHER 4-4761, TWX TU 925

Check 3506 opposite last page.

### NEW LITERATURE

Petrochemicals

**Thermocouple installation** at the Lake Charles, La. plant of Petroleum Chemicals, Inc., is discussed in one-page bulletin. More than 1000 thermocouples are used in this petrochemical plant for controlling temperatures from —300 to 2000°F. No. 3 case history — Thermo Electric Co., Inc. Check 3501 opposite last page.

**Infrared analyzer** is discussed in detail in four-page bulletin. Unit is compact, portable and highly flexible for handling a variety of gas analysis problems. Bul 0705-3 — Mine Safety Appliances Company. Check 3502 opposite last page.

**Gate valve** with nylon disc, aluminum body and stainless steel stem is presented in four-page bulletin. Construction of valve gives it resistance to a wide range of chemicals. Bul NP-76E—OPW-Jordan Corp. Check 3503 opposite last page.

**High-vacuum pumps**, are covered in 16-page technical brochure. Six standard pumps discussed are designed for operation at a wide variety of capacities to fit almost any applications in the 50 mm to 10" mm Hg pressure range. Bul 8-20 — Consolidated Vacuum Corp. Check 3504 opposite last page.

**Balanced/opposed compressor** for heavy duty in the refining, chemical and petrochemical fields are described and illustrated in 46-page Bul 160 — Clark Bros. Co., One of the Dresser Industries. Check 3505 opposite last page.

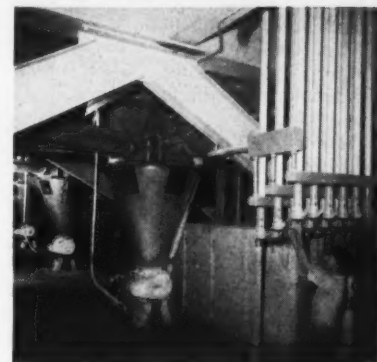
**Valves** of the full-opening, lubricated spherical plug type varying from 16 up to 30" in size, are described in 12-page Bul V607 Rev 1 — Rockwell Manufacturing Company, Meter and Valve Div. Check 3506 opposite last page.

**Welded vessels** for use in petrochemical, chemical, petroleum and other fields are discussed in catalog. Among other types, nearly 50 pressure vessels are described and illustrated. Cat on welded vessels — Pottstown Metal Products Div., Cochrane Corporation. Check 3507 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

### Problem:

To cut cost of conveying, storing and blending flour



### Solution:

## SPROUT-WALDRON PNEU-FLO® SYSTEM

With just one man on each shift, the C. F. Mueller Company unloads, blends and distributes 125,000,000 lbs. of flour a year at its six-story plant in Jersey City. Sprout-Waldron's bulk handling and Pneu-Flo positive pressure system recently installed has saved more than 25,000 square feet of floor space, reduced handling costs by \$150,000 per year, freed more than \$40,000 worth of equipment, simplified close check weighing of incoming raw materials, increased safety and reduced housekeeping and maintenance.

The system unloads and conveys to storage a minimum of one carload of flour in four hours; provides maximum diversity of storage; sizes all incoming material at a rate equal to or greater than the unloading rate; transfers the material at rates of 30,000 lbs. per hour.

The full story of this reliable pneumatic handling system is told in Bulletin I-57. Copies are available on request.



**SPROUT-WALDRON**  
Muncy, Pennsylvania

Size Reduction • Size Classification • Mixing  
Bulk Materials Handling • Pelletizing

Check 3508 opposite last page.

CHEMICAL PROCESSING

# Brown Paper specifies PVC for 80% of process piping

**Used in production of chlorine dioxide  
because interior resists chemicals handled  
and exterior is unaffected by corrosive  
atmospheres**

**RIGID** polyvinyl chloride was specified for about 80% of the process piping at the new bleach plant of Brown Paper Company in Berlin, N. H. One reason PVC pipe was chosen was because of its excellent resistance to the chemicals handled. Another is that the outer surface of the pipe is virtually unaffected by the corrosive chemical atmospheres that prevail in many areas of the plant.

## Process

PVC piping is used in connection with the Day-Kesting process for producing chlorine dioxide for the Kraft mill bleaching. In this process, sodium chloride in solution is oxidized in electrolytic cells to produce a strong solution of sodium chlorate. This is then treated with hydrochloric acid to produce chlorine dioxide and chlorine, with only a part of chlorate present being reduced to sodium.

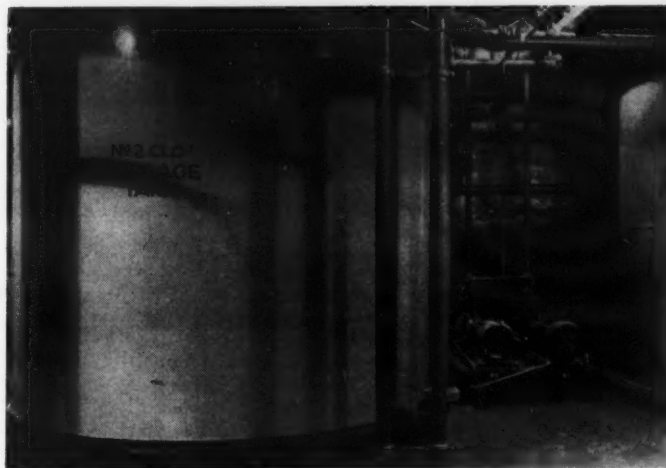
Resulting partially spent liquor is recycled into electrolytic cells while sodium chloride component is again converted to sodium chlorate.

In addition to the various ways PVC piping is used in the plant, PVC sheet, block and rods are used for cell covers, weir blocks, nuts and bolts. Little maintenance has been required on any of the PVC. Its applicability is only limited by temperature and pressure conditions.

(PVC piping and other PVC products were furnished by A. M. Byers Company, Clark Bldg., Pittsburgh 30, Pa.)

Check 3509 opposite last page.

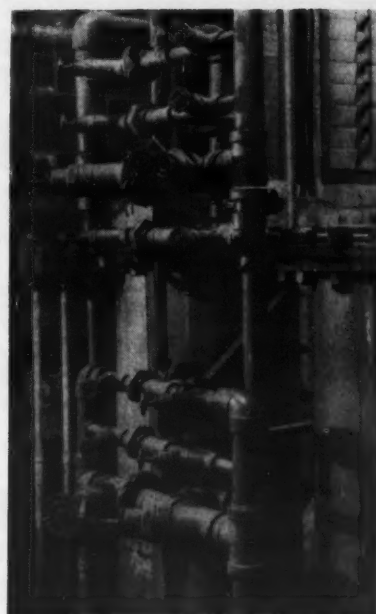
Schedule 80 PVC pipe of 3" diameter is used to feed these two chlorine dioxide storage tanks. Four-inch PVC pipe is utilized for overflow lines. Pump lines are 1½" PVC, operating at 45 psi. Temperatures are ambient. ClO<sub>2</sub> concentration is 4½-5 grams per liter



Cell bank using 2" PVC hydrogen exhaust vents and liquor overflow to sodium chlorate storage. Each cell delivers 10 gpm of product at 106°F to chlorate storage. Note welded PVC manifold in rear which continues through floor

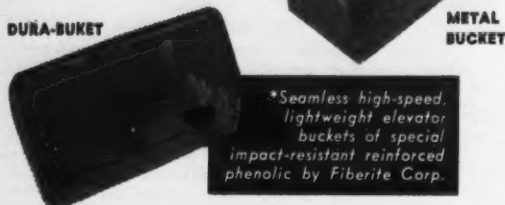
PVC manifold piping of 1 and 2" diameter handles cell liquor going to reactors. Large-diameter PVC line at right feeds hydrochloric acid to reactors

Two 4" PVC lines at far left of chlorine absorption column carry sodium hydroxide-sodium hypochlorite through a lute to the tower. The 6" PVC line nearest tower handles overflow from tower head tank feed. Concentration of sodium hydroxide is 6-10% initially, later being reduced to 3 grams per liter. Hypochlorite reaches 50-60 g/l of available chlorine. Temperatures are ambient



## Most chemicals won't eat away or cake-up in Dura-Buckets\*

DURA-BUKET



\*Seamless high-speed, lightweight elevator buckets of special impact-resistant reinforced phenolic by Fiberite Corp.

On chemical product elevator legs . . . where ordinary metal buckets corrode to uselessness in weeks . . . DURA-BUKETS resist chemical reaction and continue in service for years. DURA-BUKETS elevate a full payload on each pass over the head pulley because they don't cake-up. Self-cleaning DURA-BUKETS are more sanitary, too. The spark and static proof quality of DURA-BUKETS makes them perfect for elevating dusty or flammable materials.

DURA-BUKETS don't eat up profits . . . they elevate them. With DURA-BUKETS you can slash replacement costs and down time. WRITE FOR DETAILS AND PRICES.

## Dura-Buket

DIVISION OF

NATIONAL OATS CO. • EAST ST. LOUIS, ILLINOIS

Check 3510 opposite last page.

## DARCOVA PUMPCUPS

now available with

## 100% NYLON COMPOSITION

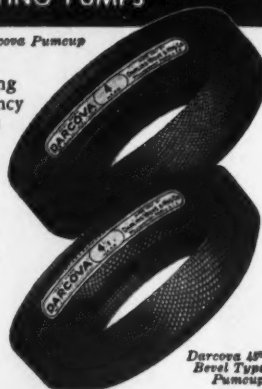
for HYDRAULIC CONTROLS, AIR CYLINDERS, RECIPROCATING PUMPS

Darcova Pumcup

DARCOVA PUMPCUPS—long noted for unequalled efficiency and life in all kinds of cylinders—are now greatly exceeding their own performance records! The new 100% Nylon Composition, available *only* in Darcova Pumcups, does it!

Nylon Pumcups are made in sizes, types and textures exactly right for your particular equipment—ready *now* to give you unprecedented piston packing performance!

Write for helpful data Bulletin No. 5903.



Darcova 100% Bevel Type Pumcup

DARLING VALVE & MANUFACTURING CO.

Williamsport 4, Pa.

TRADE MARK  
**Pumcups**

Check 3511 opposite last page.

## CORROSION CONTROL

**PVC foot-valve eliminates back flow**

Uses: For sumps, tanks, and similar applications.

Features: Valve contains a ball-type check valve which prevents back flow. Suction end is protected against intake of debris by plastic screen.

Description: Foot-valve is furnished in PVC in ½ to 2" sizes. Both seat and ball can be easily removed from valve body for cleaning. Seat is equipped with Quad ring, sealing off leakage between ball and body.

(Foot-valve is product of Chemtrol, 10872 Stanford Ave., Lynwood, Calif.)

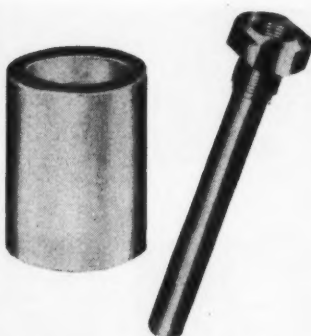
Check 3512 opposite last page.

**Temp in 2000°F range resisted by carbide-impregnated graphite**

Uses: For nozzles, thermowells, rupture discs and other applications where resistance to erosion, corrosion and high temperatures is required.

Features: Material has a high temperature limit in the 2000°F range, and possesses an extremely hard surface.

Description: Two forms of



Titanium-impregnated graphite (left) has brilliant, smooth, silvery finish. Silica-impregnated graphite has rough black finish

carbide-impregnated graphite presently are being studied for specific applications. These are titanium and silica.

In the process of impregnating, a mechanical and chemical reaction takes place where-

**Protects Metals Against Hot Acids, Acid and Sulfurous Fumes, Salt Spray Steam, Mild Alkalies Up to 600° F.**



Markal "D-A" Coatings will protect metal against any corrosive action. It is an ideal product for ore sintering plants, plating plants, food

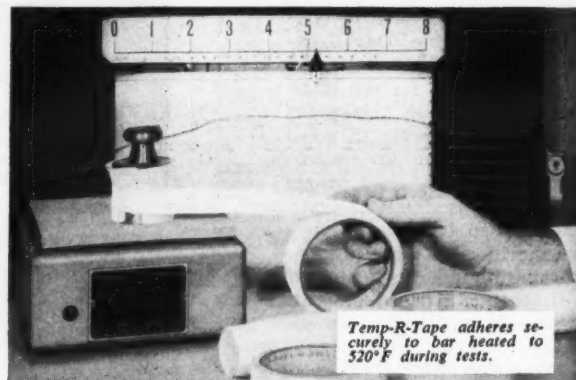
plants, lumber kilns, foundries, chemical plants, sewage disposal plants, laundries, heat exchangers . . . many others.

Markal "D-A" Coatings are applied by brush or spray and can be air dried or baked. The Coatings will withstand temperatures up to 600°F.

For free sample write on company letterhead, stating temperature extremes, surface temperature at time of application, and corrosive condition.

Other Markal Coatings are available in a complete range of types for any condition and temperatures up to 2200°F. Send for catalog No. MPC. The Markal Company, 3055 West Carroll Avenue, Chicago 12, Illinois, telephone Sacramento 2-6085

Check 3513 opposite last page.



Temp-R-Tape adheres securely to bar heated to 320°F during tests.

## CHR PRESSURE-SENSITIVE TEFLON® TAPES

- -100°F to 500°F applications
- Class H and Class C insulation
- Non-stick and low friction facing
- Chemical resistant facing
- Easy to apply

Temp-R-Tape is available from stock in rolls and sheets. All four types—Temp-R-Tape T; TH; C and TGV—combine some form of Teflon backing with silicone polymer adhesive to provide easy-to-apply pressure-sensitive and thermal curing pressure-sensitive tapes for electrical and mechanical applications. Designed for extreme temperatures, Temp-R-Tapes possess high dielectric strength, low power factor, high elongation, negligible moisture absorption, are non-corrosive and non-contaminating.

FREE SAMPLES and folder—write, phone or use inquiry service.

**CHR**

\*duPont TM

**CONNECTICUT HARD RUBBER**

Main Office: New Haven 9, Connecticut

Check 3514 opposite last page.

CHEMICAL PROCESSING



# FLUIDICS\* AT WORK

by the pores of the graphite are impregnated with the resulting carbide, rendering the graphite impervious.

Tolerance on the finished shape can be held to  $\pm 0.001''$ . Maximum sizes at present are 13" in diameter by 16" in length.

(Carbide-impregnated graphite processing equipment for the chemical industry will be marketed by Falls Industries, Incorporated, Aurora Road, Solon, Ohio.)

Check 3515 opposite last page.

## Heat transfer unit now available in titanium

Heat transfer unit, known as Platecoil, which has a number of cost-saving advantages over pipe coils, is presently being fabricated in titanium. Unit can be used for heating or cooling where pressures up to 250 psi must be met. A recent redesign of unit provides faster startup through more effective heat transfer.

(Titanium Platecoil is product of Tranter Manufacturing Inc., Lansing 9, Mich.)

Check 3516 opposite last page.

## Resin-coated fabrics withstand corrosion and abrasion

Uses: In a variety of applications where solvent resistance and radical temperature changes are encountered.

Features: Fabrics have excellent resistance to mildew, wind, salt water and various chemicals. Abrasion resistance and strength are also very good.

Description: Coated fabric 4222 consists of a modified polyester resin applied to nylon, Dacron or glass cloth. It remains flexible at temperatures from  $-80$  to  $375^{\circ}\text{F}$ .

(Fabric 4222 is product of Irvington Division, Minnesota Mining and Manufacturing Company, 900 Bush St., St. Paul 6, Minn.)

Check 3517 opposite last page.



## Now . . . GLASTEEL pipe that you can field-cut

That's new Pfaudler F-C Glasteel pipe\* you see being cut with a standard, dry abrasive cutoff wheel.

The F-C stands for "field cut." The pipe itself is steel on the outside for strength, borosilicate glass on the inside for corrosion resistance. Once you've cut the length you want, you thread and then fire-polish with a small, portable furnace. (Furnace available from Pfaudler at a modest cost that you will completely recover through savings in a few installations.) You finish the pipe end with a belt sander to make sure that the gasket seat is flat and the flange connection seal-tight.

Glass lining for this new pipe is  $\frac{1}{8}$  inch thick, so you can expect substantially longer service life even with corrosive and/or abrasive fluids. Rated at 150 psi and available in  $1\frac{1}{2}$ , 2 and 3 inch diameters, F-C pipe can be used with all acids (except HF) to  $350^{\circ}\text{F}$ . and with all mild alkalis at moderate temperatures.

Moreover, since glass is inert, you will also find this pipe useful for those products which must be kept free from contamination. And note, too, that because glass is smooth, there's little chance for

build-up with sticky materials.

Aside from the fire-polishing furnace, you will find the tools needed for handling F-C Glasteel pipe in most plant maintenance shops. There is no need to engineer a piping layout to the last  $\frac{1}{8}$  inch. Installation and modification are easy, and very little maintenance is required.

As of now, you can get limited quantities from stock in lengths through 10 feet. For Bulletin No. 989 or for answers to specific questions on availability and delivery, please write to our Pfaudler Division, Dept. CP-20, Rochester 3, N. Y.

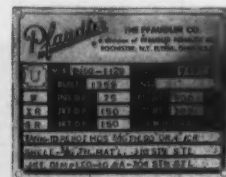
\*Patent applied for



## PFAUDLER PERMUTIT INC.

Specialists in FLUIDICS . . . the science of fluid processes

## Code approval is one measure of quality in stainless reactors



This code plate on a Pfaudler stainless steel reactor tells you that every detail of construction — materials, design, workmanship — is of the highest quality.

But how can you measure quality on a non-code vessel?

At Pfaudler, both are essentially the same. Whether you require code approval or not, specify X-ray inspection, need type 304 or 316 stainless, your reactor is made in the same plants, by the same designs and under the same quality standards.

There is more than quality in the Pfaudler trademark. It also includes:

**5 to 2,000 gallon capacities.** Complete range of sizes for convenient scale-up of your process, lab to pilot plant to production.

**Standard design.** Makes process line change-over easy, reduces cost of units; lets us stock reactors, provide 2-week delivery on certain sizes.

**"Dimpled" jackets.** Pfaudler's unique stainless dimpled construction enables you to operate economically at temperatures as high as  $600^{\circ}\text{F}$ . and jacket pressures to 150 psi. Code approved. 175 psi is available on custom designs. Dimpled jackets also give you higher heat transfer rates than conventional designs.

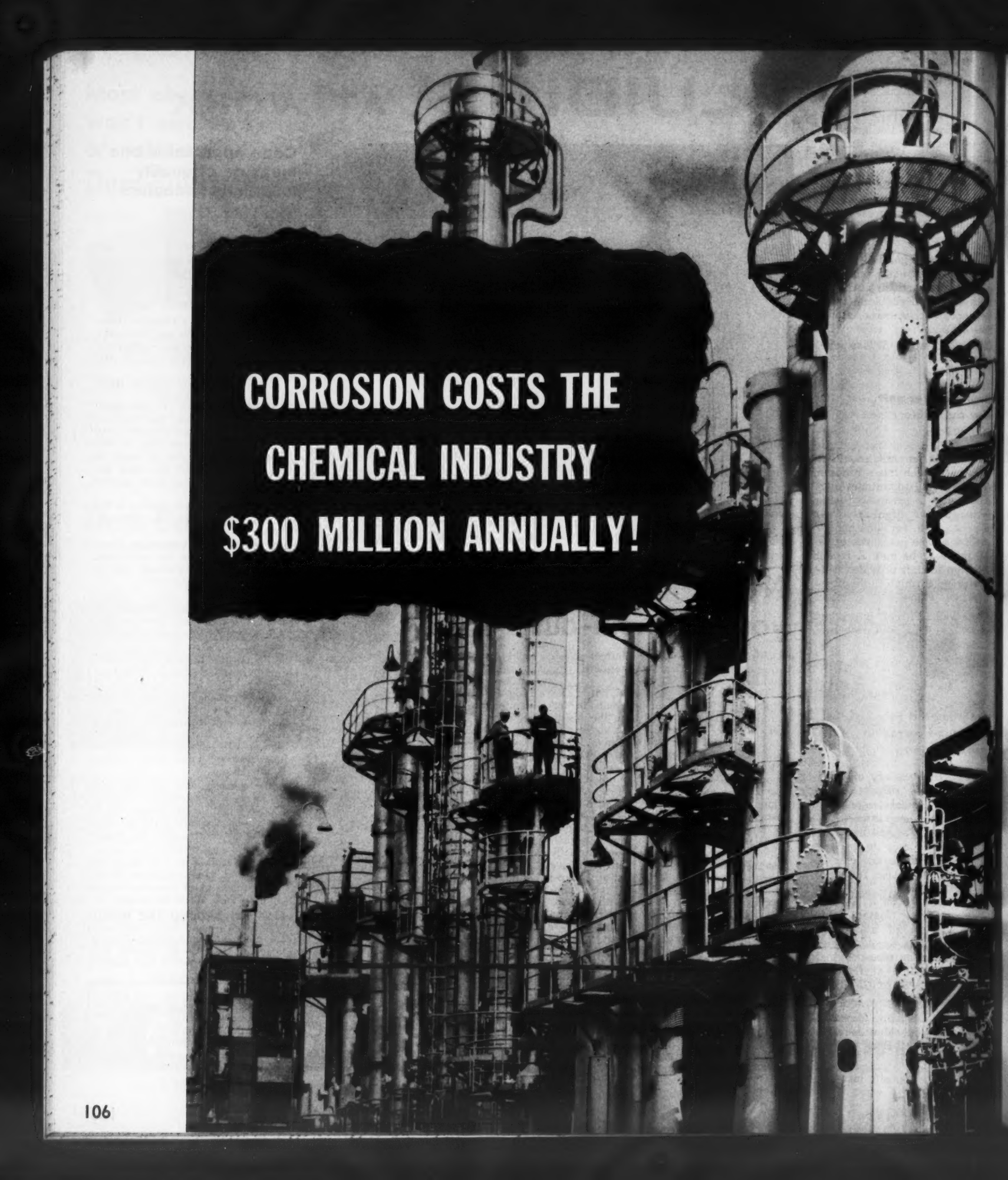
**Dollar savings.** We help you pick lowest cost construction — usually conventional jacket design up to 750 gallon size and/or 100 psi, then "dimpled" construction for higher capacities or pressures.

**Free bulletin.** You can study the details and specifications of Pfaudler stainless steel reactors in our Bulletin 944. Write for a copy.

**FLUIDICS AROUND THE WORLD** Pfaudler Permutit is a world-wide company with manufacturing plants in: Germany, Great Britain, Canada, Mexico and Japan, as well as four plants in the U. S. A.

\*FLUIDICS is the Pfaudler Permutit program that integrates knowledge, equipment and experience in solving problems involving fluids.

Check 3518 opposite last page.



**CORROSION COSTS THE  
CHEMICAL INDUSTRY  
\$300 MILLION ANNUALLY!**



# ... Now You Can Control 88% of All your Chemical Corrosion Problems with this Proven PITT CHEM® Coating System!

Probably no other industry in the nation is confronted by the variety and severity of corrosion conditions faced each day by the chemical processing industry. Corrosion engineers estimate that the annual toll in equipment and plant facilities is nearly one-third of a billion dollars.

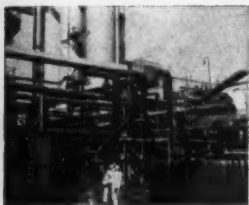
Pittsburgh now provides the chemical industry with a complete system of PITT CHEM heavy-duty protective coatings which will efficiently and economically control nine out of every ten corrosion conditions in your plant—from simple atmospheric corrosion to severe chemical attack. Service-proven PITT CHEM cold-applied coatings are now "on guard" in hundreds of chemical processing plants, adding years of valuable service life to storage tanks, piping systems and other equipment where "im-

possible" corrosion conditions once existed.

PITT CHEM Tarsset, Tarmastic and Insul-Mastic are tough, *thick film* coatings that outlast conventional maintenance paints 10 to 20 times. You measure their protection in *decades*, not years. They can be cold-applied by brush, spray gun or roller. No other system of protective coatings can solve so many of your corrosion problems so *economically*.

For more information, mail the coupon below. Then consult your nearest PITT CHEM Distributor—he's listed in the "Yellow Pages." Or call Pittsburgh Coke & Chemical Co. in Pittsburgh, New York, Chicago, Houston or Los Angeles. A PITT CHEM Corrosion Engineer will discuss your corrosion problems without obligation.

## PITT CHEM TARSET®



The original, patented coal tar-epoxy coating, Tarsset is now solving many of the severest corrosion problems in the chemical industry. Years of service as lining for acid and alkali tanks, and on piping and structural steel, have proven the revolutionary ability of Tarsset to withstand extreme chemical corrosion.

## PITT CHEM TARMASTIC®



PITT CHEM Tarmastic coal tar coatings are a series of thick-film protective coatings designed to solve a wide variety of corrosion problems at moderate cost. Excellent for protection of hoods, fans, housing and other equipment against steam and very corrosive vapors, mild acid and alkaline solutions and extreme moisture conditions.

## PITT CHEM INSUL-MASTIC®



Vapor and moisture penetration problems are solved economically and effectively with time-tested Insul-Mastic Gilsontite-asphalt coatings. Ideal for the protection of metal, concrete and masonry surfaces against weather, moisture and many chemicals and vapors. Insul-Mastic cork mastics provide good insulating qualities and condensation control.

## PITT CHEM PIPELINE ENAMELS



For the long-term preservation of underground pipelines, coal tar enamels are considered the most practical and effective method of protection ever developed. PITT CHEM Pipeline Enamels are widely recognized for their excellent quality and service record on oil, gas and water transmission and distribution lines throughout the nation.

## CORROSION CONTROL

**Polyethylene tape  
saves company  
\$800,000**

Cuts cost for coating 1616-mile pipeline

Use of polyethylene tape saved the Houston Texas Gas and Oil Corporation more than \$500 a mile for a 1616-mile section of The Texas-to-Florida pipeline over conventional methods of coating such a line. Since pipeline section is 1616 miles long, including laterals, more than \$800,000 was saved.

More than 41 million sq ft of tape was used to coat the line. Tape is 14 mils in thickness and was spirally wound on line from rolls 18" wide and 800' long. During one day, 17,000 feet of the line was taped by a single machine and crew.

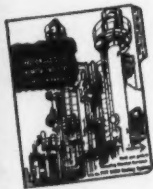
Tape is waterproof and a good electrical insulator. It is expected to provide excellent protection to the line. Cathodic protection is also used on line to help prevent galvanic corrosion.

(Polyethylene tape is product of The Kendall Co., Polyken Sales Div., 309 W. Jackson Blvd., Chicago 9, Ill.)

Check 3520 opposite last page.

(Polyethylene used in tape is product of Union Carbide Plastics Company, Div. of Union Carbide Corporation, 420 Lexington Ave., New York 17, New York.)

Check 3521 opposite last page.



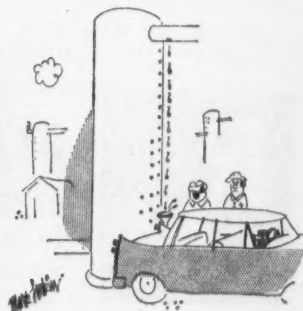
### Send for Your Free Copy of this CHEMICAL CORROSION DATA FILE

Includes a survey of corrosion problems in the Chemical Industry, data on PITT CHEM Coating Systems and a coating selector guide. Write for your copy today.

Name \_\_\_\_\_ Title \_\_\_\_\_  
Company \_\_\_\_\_  
Street \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_



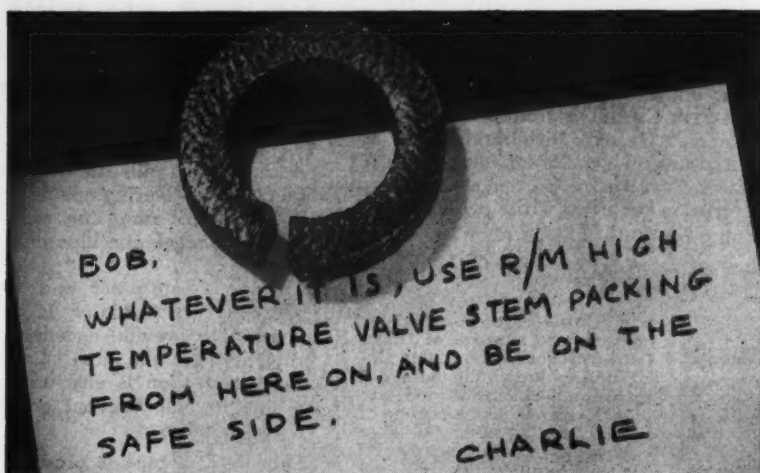
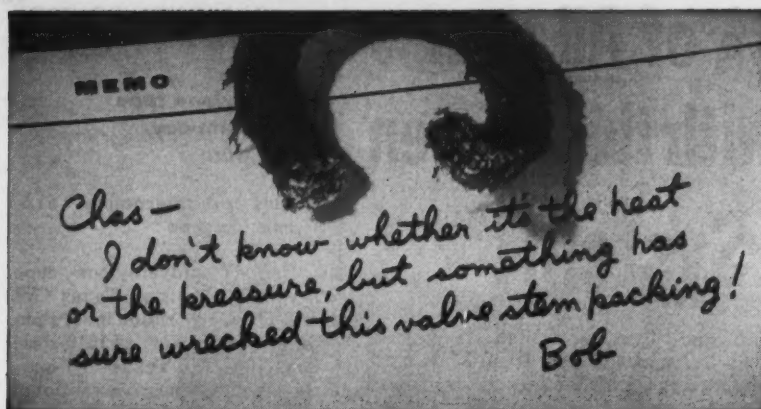
1136



"Okay, it's full . . . report the leak."

Check 3519 opposite last page.





R/M's experienced packing engineers designed this line of packings to help you lick the problems caused by higher temperatures and greater pressures in today's processing lines. R/M High Temperature Valve Stem Packings contain practically no organic materials—and it is these organic materials which cause a lot of your trouble by burning and causing volume loss. Lubricants are ground in during manufacture; so they are thoroughly dispersed all through the packing. And braided asbestos yarn provides you with the maximum performance in pressure resistance.

Among the other packing products

R/M MAKES A COMPLETE LINE OF MECHANICAL PACKINGS—including Vee-Plex,\* Vee-Square,\* Universal Plastic, and "versipak"; GASKET MATERIALS; "TEFLON" PRODUCTS. SEE YOUR R/M DISTRIBUTOR.  
\*A Du Pont trademark

R  
M

## PACKINGS

**RAYBESTOS-MANHATTAN, INC.**  
PACKING DIVISION, PASSAIC, N.J.  
MECHANICAL PACKINGS AND GASKET MATERIALS

RAYBESTOS-MANHATTAN, INC., Mechanical Packings • Asbestos Textiles • Industrial Rubber • Engineered Plastics  
Sintered Metal Products • Abrasive and Diamond Wheels • Rubber Covered Equipment • Brake Linings  
Brake Blocks • Clutch Facings • Industrial Adhesives • Laundry Pads and Covers • Bowling Balls

Check 3522 opposite last page.

## CORROSION CONTROL



Chemically deposited-nickel-lined tank prior to installation at Wyandotte Chemicals

## Continuous immersion in caustic withstood by chemical nickel lining

**Application by chemical means gives lining expected to last 10 years or longer instead of 1 1/2 years obtained with coatings previously used**

**GORDON WEYERMULLER**, Associate Editor  
with **RICHARD SWANDBY**, Corrosion Engineer  
Wyandotte Chemicals Corporation,  
Wyandotte, Michigan

**Problem:** Previous organic linings used for storage tanks in continuous immersion service with 74% caustic at 260°F lasted only about 1 1/2 years. Relining at such frequent intervals caused high maintenance costs and loss of tank while it was not in production.

Plant desired a longer-lasting lining for this type of service. A surface was required with no porosity.

**Solution:** In January 1959 plant installed a tank with a Kanigen nickel-phosphorus lining, applied to surface by

chemical means. By this procedure, a nickel plating solution is pumped in the tank. By catalytic chemical reduction the lining, consisting of nearly all nickel, plates out on the surface.

Plating bath contains the nickel salt, sodium hypophosphite reducing agent, an organic buffering and complexing agent which enhances stability and prolongs bath life, and an organic exhaltant which improves the plating rate. Surface to be plated is the catalytic agent. Since nickel is also a catalyst for the

reaction, the surface continues to be catalytic even after it is completely covered. This permits continuous plating to any thickness although practical thicknesses are dictated by cost, adhesion and other factors. Rate of reaction is influenced by temperature, which should be as close to boiling as is practical.

This tank is 12' in diameter and 21' 6" high. A second tank lined the same way was placed in service in the fall of 1959.

**Results:** In place of 1½ years, tests conducted by Wyandotte Chemicals indicate that the Kanigen-lined tanks will last 10 years and possibly 20 years in the service involving continuous immersion in caustic. Tests also showed very little nickel pickup by caustic, a good indication of durability of lining.

(Nickel lining method is development of Kanigen Div., General American Transportation Corporation, 135 S. La-Salle St., Chicago, Ill.)

Check 3523 opposite last page.

#### **Field cutting possible with glassed-steel pipe for corrosives**

**Uses:** Pipe offers wide application in corrosives services. It will handle all acids except HF to 350°F and to even 450°F, depending upon concentration, and mild alkalis at moderate temperatures.

**Features:** Field cutting offers savings in less detailed piping layouts, faster installation, and inexpensive maintenance.

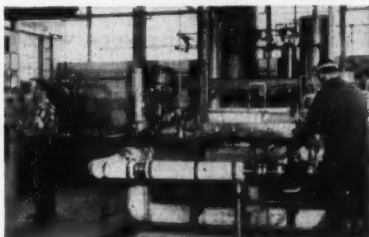
**Description:** Piping has more than twice the thickness of glass coating on interior as previous glass-lined pipe. The greater thickness of about ⅛" for the boro-silicate glass provides added resistance to corrosion and abrasion.

(Glasteel pipe is product of Pfaudler Division, Pfaudler Permutit Inc., 1098 West Ave., Rochester 11, N.Y.)

Check 3524 opposite last page.



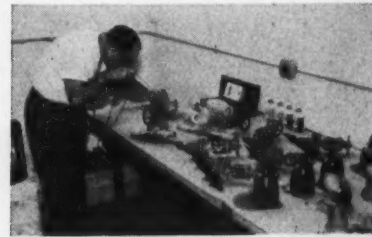
14" 300 lb. gate valve slated for a large petro-chemical plant, is being worked on one of Aloyco's battery of new Bullards.



One of finest hot test loops in the nation checks out valves at up to 2500 psi, 650°F. Hot tests can spot trouble that would otherwise be revealed only after months of line service.



New multimillion dollar Aloyco plant combines new production tools, test facilities, sales, administration, research and development offices and labs into single integrated unit.



Boroscope examination (in pressurized clean room) of specially made nuclear valves follows the application of dye penetrant.

## **Advanced machines... tools...test facilities expand Aloyco Valves' range of service**

Constant change and improved techniques in modern fluid handling, pose a real challenge for valve manufacturers.

To meet these demands, Aloyco is constantly adding new facilities, some of which are pictured here.

For example, Aloyco Stainless Steel Valves are now available in sizes up to 24", pressures up to 2,500 lbs. at 650°F.

While these new facilities have improved and expanded the quality and usefulness of our entire line, they are particularly important, for example, in the manufacture of valves for the nuclear and missile fields.

For advanced knowledge and ideas plus the equipment to carry them out—take your next valve problem to the specialists: Alloy Steel Products Company, 1302 West Elizabeth Avenue, Linden, New Jersey.

## **ALLOY STEEL PRODUCTS COMPANY LINDEN, NEW JERSEY**

Boston • New York • Wilmington • Atlanta • Birmingham • Baton Rouge • Buffalo  
Pittsburgh • Chicago • St. Louis • San Francisco • Los Angeles • Seattle



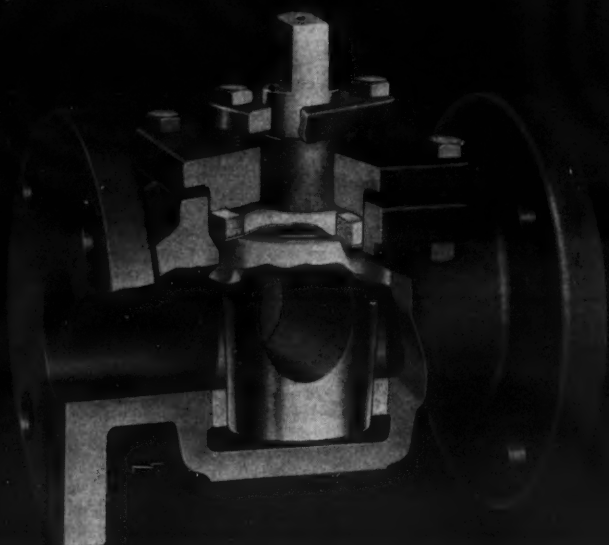
Check 3525 opposite last page.

# WHAT USERS SAY ABOUT THE NEW DURCO TYPE G

The new Durco Type G SLEEVELINE is a non-lubricated plug valve. A Teflon sleeve is pressed into a ductile iron or stainless steel body; a machined plug, Teflon diaphragm and gasket, a thrust collar, and a self-aligning adjuster make up the rest of this trouble-free, non-lubricated plug valve.

Available in ductile iron or stainless steel, screwed or flanged ends from  $\frac{1}{2}$ " through 2", and in ductile iron flanged ends 3", 4", and 6". 150 psi rating.

Write for bulletin V/12.



THE DURIRON COMPANY, INC., Dayton, Ohio

## *sulfuric acid service*

“Entirely satisfactory in service on 66°Bé sulfuric acid after 8 months.”

## *latex user*

“Valve on Latex service since May 1, has given no trouble. Other valves (gate, globe, ball, wedge, lift plug) failed because Latex build-up froze the valve.”

## *chlorine gas service*

“In service for ten months on chlorinator handling dry chlorine gas at 50 psi—ambient temperature. Formerly used lubricated valve which gave considerable trouble due to freezing.”

## *caustic service*

“Valves used on cell liquor, concentration 12%, at 160°F. After one month valve was removed and inspected. All movable parts were free, no wear was evident. Valve was reinstalled and has been in six months continuous service with completely satisfactory performance.”

## *phosphorous user*

“Used on yellow phosphorous at 160-200°F. Valves are doing fine. Thanks for a product that works—and a valve that I can turn with one hand without breaking my back.”

## *solvent handling*

“Valves performing very well on toughest solvent service after five months, where lubricated plug valves were regularly replaced due to sticking caused by leaching out of lubricant.”



Valves • Pump • Filters • Process Equipment

## PROBLEMS?

Interested in solving them? Want to learn new ways of improving your plant operation and, thereby, realize savings?

## *In each...*

issue of CHEMICAL PROCESSING there are articles that will help you solve many of your operational problems.

These “New Solution” stories appear in the “New Solutions” section which begins on page 30 of this issue.

This type of story is featured in other sections throughout the magazine.

They are case history stories that state the operating problem, explain how it was solved, and describe the results obtained.

“New Solution” stories cover all important phases of your operations — processing, safety, maintenance, material handling, packaging, corrosion, to name a few.

For more information on product at left, specify 3526 see information request blank opposite last page.



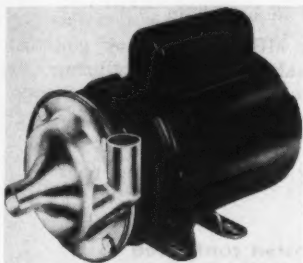


## CORROSION CONTROL

### Economical chemical pumps made from variety of alloys

Line of centrifugal chemical pumps is announced with 14-gage stamped and drawn housings. This type of construction and design effect substantial reduction in initial pump cost, weight and size.

Alloys available from stock include steel, brass, Monel, 18-8, 316 stainless and Car-



Corrosion-resistant pump for capacities to 90 gpm

penter 20. Titanium, tantalum and zirconium can be furnished on order. For above abrasive conditions, a double mechanical seal with a pressurized oil chamber can be supplied.

Pumps can be furnished in range of 1/4 to 2 hp, with heads to 100' and capacity to 90 gpm. Sizes from 1/40 to 7 1/2 hp will be available.

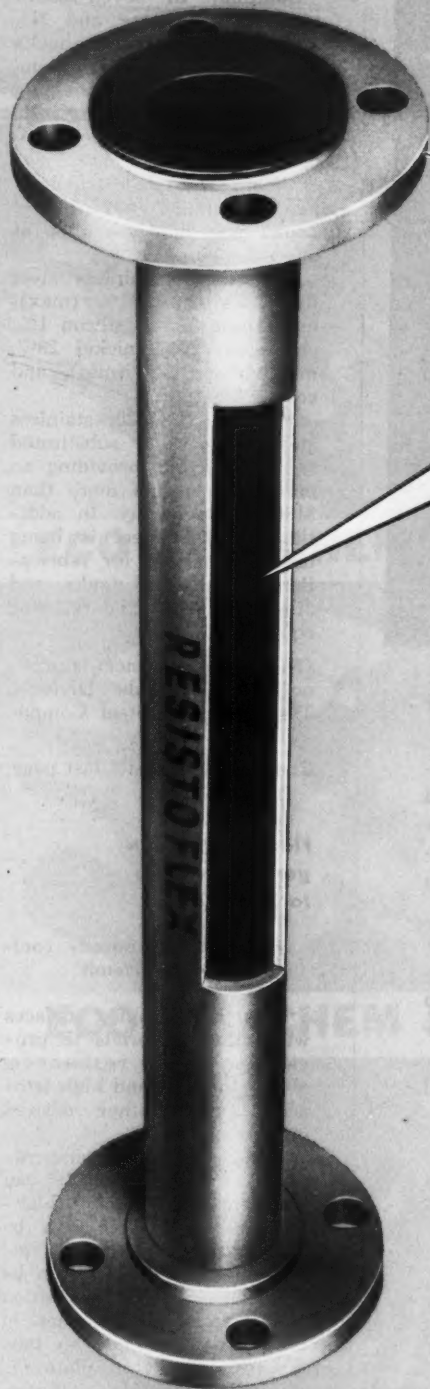
(Centrifugal pumps are product of R. S. Corcoran Company, PO Box 1404, Joliet, Illinois.)

Check 3527 opposite last page.

### Pickle hook replacements reduced by four-fifths with stainless steel

Savings total \$1800 annually as result of changeover

**Problem:** Sulfuric acid attack in 180°F pickling solution for descaling forged crankshafts rapidly corroded pickling hooks at Chevrolet Motor Company's Forge Standards Department in Detroit, Mich. General-purpose corrosion-resistant alloy hooks in use had to be replaced at average rate of 157



Permanently corrosion-proof, cheaper in installation, operation, and maintenance costs—

## That's Prefabricated Fluoroflex-T Lined Pipe by Resistoflex!

Yes, steel pipe lined with Resistoflex's special patented Fluoroflex-T form of Teflon® has the answer to your problems of cost, corrosion, and maintenance of piping to handle corrosive liquids. Check these four important features:

**1. No corrosion, no leakage:** Fluoroflex-T is absolutely inert to all chemicals except high-temperature fluorine and the molten alkali metals.

**2. Prefabricated** Fluoroflex-T lined pipe comes in the sizes and lengths specified in your piping plan, with flanges, in length, ready to bolt together. That's why it is easier, simpler, and cheaper in overall costs to install than pipe you have to fabricate to size on the job.

**3. Fluoroflex-T liner** is formed over the full gasket face of the flange, so that no extra gaskets are needed. The smoothly-faced Teflon flange surfaces fit together, to form a perfect seal *without leakage!* The gasket faces adjust to each other with complete closure to liquids, even up to 150 psi pressure!

**4. Fluoroflex-T lined pipe** has inherent thermal expansion equilibrium between the liner and the steel, the result of years of research and design by Resistoflex, pioneers in fluorocarbon developments. This Resistoflex feature is essential for optimum service life at high temperatures.

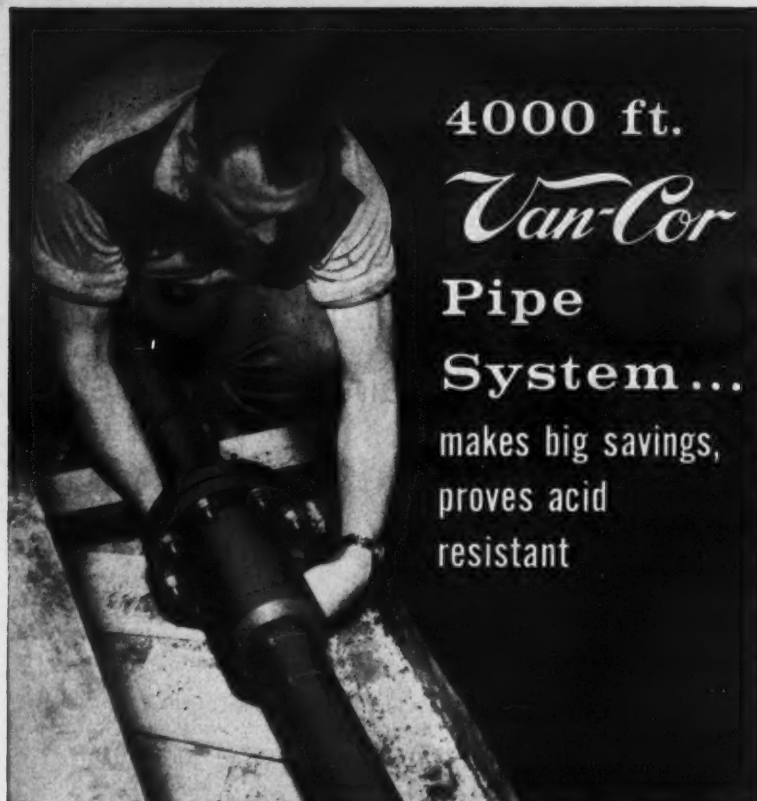
Fair enough? Why not look into what Fluoroflex-lined steel pipe can do for you? Write for data today.

®Fluoroflex is a Resistoflex trademark, reg. U.S. Pat. Off.  
®Teflon is DuPont's trademark for TFE fluorocarbon resins.

## RESISTOFLEX CORPORATION

Complete systems for corrosive service  
Plants in Roseland, N. J. • Anaheim, Calif. • Dallas, Tex.  
Sales Offices in major cities

Check 3528 opposite last page.



4000 ft.  
*Van-Cor*  
Pipe  
System...  
makes big savings,  
proves acid  
resistant

At the Allentown (Pa.) Works of the Western Electric Co., the entire waste acid disposal system in the recent addition consists of Van-Cor rigid PVC pipe and fittings.

**HOW COSTS WERE CUT.** Initial price of Van-Cor was 1/3 that of comparable cast iron alloy pipe. On a 6" line, labor costs were estimated at 29¢ per foot of run—about half that of metallic pipe. Also, because Van-Cor has only 1/10 the weight, no mechanized handling equipment was needed. Available in 10 or 20 ft. lengths, Van-Cor requires fewer joints, and eliminates the breakage problem.

**CORROSION LICKED.** Van-Cor pipe was used because "corrosion resistant" cast metallic pipe had performed short of expectations in an adjacent building. After 1 1/2 years service, the Van-Cor system is in excellent shape, unaffected by such acids as hydrofluoric, hydrochloric, sulphuric, nitric and many plating solutions.

Investigate Van-Cor Pipe, Fittings, Valves, Electrical Conduit, and Fabrications...

Write for Catalog and Name of Nearest Distributor



INDUSTRIAL DIVISION OF  
**COLONIAL PLASTICS MFG. CO.**  
Subsidiary of THE VAN DORN IRON WORKS CO.  
2685 EAST 79TH STREET CLEVELAND 4, OHIO

Check 3529 opposite last page.

## CORROSION CONTROL

annually—total of 944 during six-year period.

**Solution:** In seven-month test, hooks in use and No. 20 stainless steel pickle hooks were compared on chain conveyor operating over pickling tank containing 10% sulfuric acid solution. At start and conclusion of test, both sets of hooks were micrometered. Erosion rate of stainless steel hooks was one-fifth that of other hooks.

Analysis of stainless steel used: Carbon 0.07% (max), manganese 0.75%, silicon 1%, chromium 20%, nickel 29%, molybdenum 2% (min), and copper 3% (min).

**Results:** No. 20 stainless steel hooks were substituted for other types, providing an annual savings of more than \$1800 for company. In addition stainless steel is being used extensively for fabrication of pickling tanks and other sulfuric-acid-resisting equipment.

(No. 20 stainless steel is product of Alloy Tube Division, The Carpenter Steel Company, Union, N. J.)

Check 3530 opposite last page.

### Flame spray gun generates temp to 30,000°F

Produces high-density coatings of many metals

**Uses:** For spraying surfaces with other materials to provide corrosion resistance, ability to withstand high temperatures or other desired properties.

**Features:** Since temperatures as hot as 30,000°F can be generated, many high-melting-point metals can be successfully sprayed. Most inorganic materials that can be melted without decomposition can be applied. Others now in development include — tantalum, palladium, platinum, zirconium diboride, columbium, hafnium, vanadium carbides and refractory borides of hafnium and cerium.

**Description:** Flame spray gun operates on inexpensive inert gases, with high electrical power conversion efficiency

and long component life. Fuel costs are only 1/3 to 1/2 those of oxygen fuel gas equipment for equivalent heat output.

Despite melting temperatures of 10,000 to 15,000°F, sprayed work remains cool. High fluidity of particles and high velocity of impingement bond particles together and provide adhesion to surface.

Absence of air minimizes oxidation. Other advantages are pushbutton control, simple training of personnel and safety in operation.

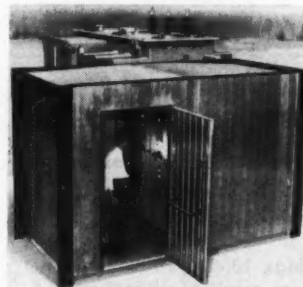
(Type MB plasma spray gun is development of Metallizing Engineering Co., Inc., 1101 Prospect Ave., Westbury, Long Island, N.Y.)

Check 3531 opposite last page.

### Corrosion controlled by aluminum outdoor switchgear housing

An answer to outdoor switchgear housing corrosion problems is provided by unit made of extruded aluminum panels. Aluminum extrusions are snapped together.

Light weight and modular construction speed handling and installation. Concrete pier foundations are adequate to support the base. Design permits an increased flow of air through filters in bottom and



Aluminum switchgear housing is light weight and easy to install

out of top of housing. Directed air flow within housing keeps internal heat at a minimum.

(Aluma-clad switchgear housing is product of Allis-Chalmers Mfg. Co., Milwaukee 1, Wisconsin.)

Check 3532 opposite last page.

THAT'S  
INTERESTING

#### Hue & dry

Ten years ago the usage of water-base paints was negligible, but last year 70 million gallons were splashed around the countryside by do-it-yourselfers, mostly on interiors. With advent of water-base exterior paints, increased use is foreseen. In five years this use alone is expected to amount to 50 million gallons.

#### Pen-size radios

A dictaphone that you can wear on your wrist or a radio the size of a fountain pen may be on the market within three to five years because of versatility of alumina—powdery white oxide from which metallic oxide is made. Alumina is used in micromodules, blocks 0.3" square and designed to contain all elements of electronic circuit.

For more information on product at right, specify 3533 see information request blank opposite last page.

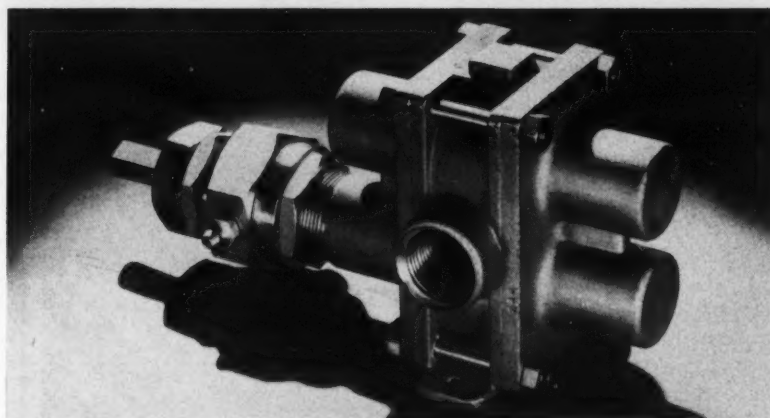


# ECO

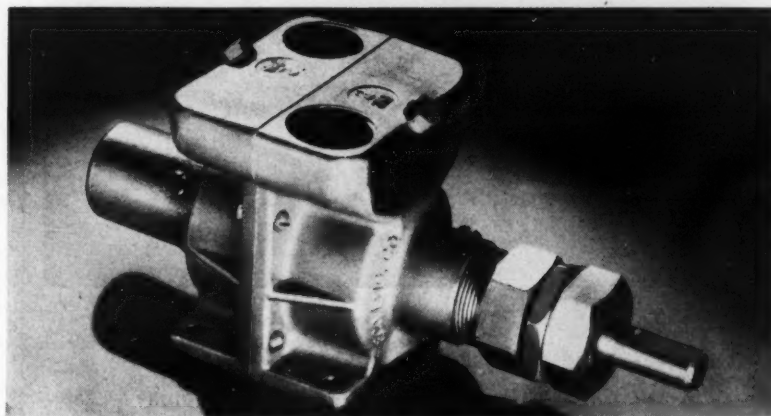
## ENGINEERING

# NEWS

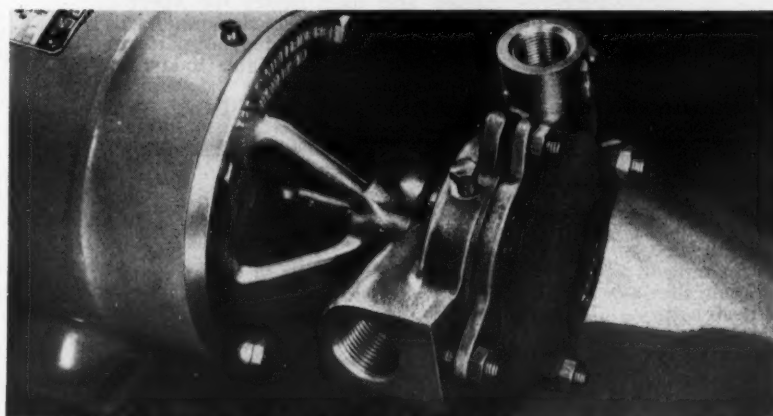
*the big name in small pumps for the process industries*



### ECO GEARCHEM PUMPS



### ECO ALL-CHEM PUMPS



### ECO CENTRI-CHEM PUMPS

\*Union Carbide Trademark. †du Pont Trademark.

## THREE BASIC DESIGNS

### Serve Most Small Chemical Pump Needs

**GEAR:** If you require self-priming and intermittent or sustained operation with constant flow metering and reproducible accuracy within plus or minus 1 percent, or maintenance of vacuum in the micron range—handling all commercial chemicals, acids, oxidants, alkalies, aromatics, solvents—select the Eco GEARCHEM Pump. For temperatures up to 400° F and viscosities to 10,000 SSU. Capacities to 10 gpm. Pressures to 100 psi.

**ROTARY:** If you want linear, non-segmented, non-foaming flows, ideal for shear-sensitive emulsions and safe for auto-detonating fluids—select the self-priming Eco ALL-CHEM Rotary displacement pump with twin opposed oscillating impellers. Designed for severe corrosive service. For reduced viscosities and temperatures to 250° F. Capacities to 10 gpm. Pressures to 100 psi. Suitable for metering in conjunction with Rotometers.

**CENTRIFUGAL:** If you want a widely applicable, corrosive-resistant centrifugal pump handling most chemicals, including slurries with particle size up to 1/4 of an inch, as well as troublesome sticky fluids—select the Eco CENTRI-CHEM Pump. This pump was designed to meet the standardization programs of major, multi-plant chemical companies. Capacities to 40 gpm. Heads to 57 feet.

## GREAT VERSATILITY

The widest variety of metals and non-metals for every corrosion and contamination problem are utilized in Eco Pumps. These include the stainless steels, Stellite, Hastelloy\* B and C, monel, nickel, zirconium and titanium; Teflon†, phenolic plastics, Hypalon, Nylon, ceramic, carbon, etc.

## Mass Produced and Stocked for Immediate Delivery

Eco Pumps are *not* "custom built" with attendant slow delivery and high cost. They are stock pumps, produced in volume on automatic "program" machine tools where multiple operations are performed to reduce needless labor and handling. This results in lower prices, precision uniformity and complete interchangeability of parts to meet customer requirements and to facilitate field servicing.

Ask for literature on the complete Eco pump line.

ECO ENGINEERING COMPANY • 12 New York Avenue • NEWARK 1, N.J.



# "X" MARKS THE SPOT

where a \$1.05 saving  
went through the roof!



On a 250 gallon paint order, the Plant Maintenance Department figured to save \$1.05 per gallon by using a paint that was cheaper, and "just as good" as Tygon. The cheaper paint appeared to be doing a good job — then the roof fell in!

These people learned the hard way what most corrosion engineers already know: the cheapest paint rarely gives the most economical protection. Where proven corrosion resistance is concerned, it's virtually impossible to find a paint that offers lower cost per year per square foot of protection than Tygon Paint.

Tygon Protective Coating Systems are designed for practical application of specialized protection against a wide range of specific corrosives and exposure conditions. The broad Tygon line includes vinyl-based coatings, as well as formulations based on epoxy resins. Depending upon the specific use for which each coating is designed, Tygon Paints provide more effective, longer-lasting protection against such corrosives as

acids, alkalis, oils, water, alcohols and many solvents. Tygon is available for simplified, economical application by brush or cold spray — and in the Tygon "ATD" Series — by hot spray methods.

Properly applied and used under the specific conditions for which they are recommended, Tygon Coatings will outlast and out-perform practically any other paint available today.

Write for this free Tygon Data Book. It gives complete application details plus helpful information on resistance of Tygon to over 150 corrosives.



PLASTICS & SYNTHETICS DIVISION



Tygon is a registered Trade Mark of the U. S. Stoneware Co.

101-G

Check 3534 opposite last page.

## NEW LITERATURE

Corrosion Control

**Metal treatment**, which when applied to rusted metal, changes rust into iron phosphate, is described in four-page Form 16 — Rusticide Products Company.

Check 3535 opposite last page.

**Tubing** of small diameter made from columbium, tantalum and vanadium is described in five-page memo 121 — Superior Tube Company.

Check 3536 opposite last page.

**Corrosion-resistant metals**, including solid and clad base metals, solid and clad precious metals, thermostat metals, electrical contacts and other metals and alloys are described in 12-page Bul GP-1A — Metals & Controls Div., Texas Instruments Incorporated.

Check 3537 opposite last page.

**Metering chemical pumps** for automatically handling corrosive and non-corrosive chemicals are illustrated and discussed in four-page Bul 530 — Process Equipment Div., Lapp Insulator Company, Inc.

Check 3538 opposite last page.

**Heat exchangers** made of impervious graphite and circulating steam jets for heating or cooling corrosive solutions in all types of tanks are discussed in 12-page Cat Section S-6620 — National Carbon Company, Div. of Union Carbide Corp.

Check 3539 opposite last page.

**Protective coatings** are covered in comprehensive 38-page treatise on corrosion control. Highlight of the manual is the information on colors that provide beauty as well as protection. Technical information on applications is included. Form 259 — Rust-Oleum Corporation.

Check 3540 opposite last page.

**Hot-dip aluminum coating** which prevents atmospheric corrosion and high-temperature oxidation and scaling of ferrous parts is discussed in four-page brochure. Form 11-59-5M — Arthur Tickle Engineering Works, Inc.

Check 3541 opposite last page.

**Protective coating systems** for concrete floors are compared in chart. Resistance of each system to chemicals, thermal shock, abrasion and temperature is given. Chart No. 10—Carboline Company.

Check 3542 opposite last page.

## Buying Black in Bulk Saves \$350 per Shift

**Inplant closed-bin handling pays for self in year;  
brings bonus savings in reduced labor, spillage**

**Problem:** Hand-dumping of 50-lb bags containing six types of carbon black was a costly, dusty, morale-dropping operation at Gates Rubber Company, Denver, Colo. Dusting, spilling and incomplete bag emptying lost 1% of the black—700 lb in only one shift. Empty bags caused a disposal problem too.

Buying and handling in bulk was the obvious answer. But it was clear that such a handling system would have to be highly versatile. It would have to economically service Banbury mixers in remote, scattered locations and accommodate frequent formulation changes and the various types of black used in the plant.

**Solution:** Gates finally decided on bulk handling in closed bins, and began using them about three years ago. The company is now employing 100 aluminum bins, each having a 110-cu-ft capacity capable of holding 2200-2800 lb of black (depending on bulk density).

As black arrives by hopper car it is conveyed by screw to bucket elevator which feeds a six-bin filling-area screw. As each bin is filled an automatic switch transfers feed to next bin in line. When

three are filled, they are removed by fork-lift truck which then replaces them with empties. Storage area is adjacent to filling station so little time (less than 10 minutes) is required for the change.

Stored full bins are later used either in the master-mix building near receiving area or in various parts of the plant. They are carried to remote Banbury mixers by Gates-owned flatbed truck which handles 10 bins per load. Truck brings empties back to filling station.

At each mixing area, fork-lift trucks carry the bins to double-air-cylinder tilting mechanisms which convert the hermetically sealed bins into discharge hoppers. Automatic preset flowout is assured at each gasketed tilting arrangement, allowing more than one type of black to be dumped into process in the quantity desired.

**Results:** Buying in bulk has saved Gates over \$350 per shift (based on use of one 70,000-lb bulk hopper car of black per shift). This alone paid for all equipment of the bulk handling system in a little more than one year.

Complete bin interchange for the full contents takes

less than five minutes, which means a substantial saving over previous hand-dump operations. Dust and spillage are now at a minimum, so morale is much improved. No longer is the 700 lb of black lost per shift.

System has proved so suc-

cessful at Denver that Gates is now installing it at the company's new Nashville plant.

(Tote Bins and Tote Tilt are developments of Tote System, Inc., Beatrice, Neb.)

Check 3543 opposite last page.



At filling station, six bins are in position at a time (first of second "bank" of three is visible at extreme left). Carbon black is fed through screw conveyor above bins



Tilting mechanism discharges carbon black from bins into screw conveyor which carries it to process. Preset scales determine amount from each bin

# "H-25 PAYLOADER"® power-steering and power-shift are the biggest advantages"\*



\*E. W. Carpenter, Plant Superintendent of G. B. C. Chemical Corp., Fairmount, Indiana also says, "These features have greatly increased efficiency over any loader previously used. It is fast, and well-balanced for maximum load-carrying capacity."

Marion Logan, the operator, adds, "I get more production with less effort because of the easier, faster operation. The even, steady pull delivered by the new power-shift transmission gets full loads with less abuse to the machine."

There are many reasons why the Model H-25 will dig, carry and deliver more tonnage with lower operating and maintenance costs than anything near its size. One is the power-shift transmission — exclusive in its class — with two speeds forward and reverse. Others are the power steer; power-transfer differential; 4,500 lbs. breakout force; 2,500 lb. carry capacity; shortest turning radius of only 6 ft.

The H-25 has been engineered to provide extraordinary protection against dust and dirt damage: triple air cleaner system; cartridge-type oil filter on all three oil systems; sealed, self-adjusting service brakes; parking brake enclosed in transmission; special grease and oil seals on all vital points.

Why not find out what a Model H-25 can do on your work? Ask your Hough Distributor for a demonstration, and ask about Hough Purchase and Lease Plans too.

THE FRANK G. HOUGH CO.  
744 Sunnyside Ave., Libertyville, Ill.

2-A-1

Send data on new H-25 "PAYLOADER"

Name \_\_\_\_\_  
Title \_\_\_\_\_  
Company \_\_\_\_\_  
Street \_\_\_\_\_  
City \_\_\_\_\_  
State \_\_\_\_\_

# HOUGH®



THE FRANK G. HOUGH CO.

LIBERTYVILLE, ILLINOIS

SUBSIDIARY — INTERNATIONAL HARVESTER COMPANY



## HANDLING & PACKAGING

### Makes platform scale semi-automatic

**Uses:** For bagging or other filling operations. Can be used in conveyor, vibrator, or gravity-feeder systems or where hopper arrangements are employed to feed materials in bulk.

**Features:** Platform scale can be equipped with a magnetic reed switch at end of beam, for feeder cutoff control . . . making it semi-automatic.

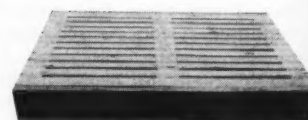
**Description:** Scale has maximum capacity of 300 lb, platform size of 10½ x 14½". Fifty-lb-capacity upper beam is marked off in ¼-lb graduations; lower beam (250-lb capacity) is marked off in 50-lb graduations.

(Model 4500 platform counter scale is product of Detecto Scales, Inc., 540 Park Ave., Brooklyn 5, N.Y.)

Check 3545 opposite last page.

### Rigid, strong wood pallet holds dimensions, has no nails

Wooden pallet made of a combination of kiln-dried soft woods and air-dried hardwoods has three advantages. It has no nails to work loose and damage containers.



Boards laminated and tied together with rods provide sturdy, dimensionally stable pallet

"On end" laminated construction is strong, takes abuse where other construction will fail. Manufacture is to exact dimensions, which are held by the dry lumber and rigid construction—important where faulty pallets could jam automatic conveyor lines.

Pallet is made by laminating individual precut boards together into sections, with waterproof glue. Sections are machine-planed to exact dimensions and joined together under pressure. Full-length steel rods are inserted and

Check 3544 opposite last page.



## HANDLING & PACKAGING

tightened for rigidity. If desired, pallet is sanded to a smooth surface.

No special attachments are required for handling with standard fork-lift and hand pallet trucks. Pallet can be manufactured in various standard sizes and, depending on requirements, will weigh the same as to one-third more than a standard wooden pallet.

Cost will be from two to four times that of conventional pallet, but manufacturer states that savings in maintenance, downtime, spillage and other factors will more than justify the additional cost.

(Nail-less pallet is product of Pallet Repair Co., Inc., 50 Stover Ave., Kearny, N. J.)  
Check 3546 opposite last page.

### **Puts quality print job on bags and cartons in production line**

**Uses:** Prints anywhere on multiwall bags or knocked-down cartons of any size, handling top and bottom simultaneously.

**Features:** Flexigraphic inking system is reported to provide commercial-quality printing on production-line operations. Impressions remain uniform and non-blurred during entire run. Machine's ink supply can be replenished without shutting down.

**Description:** Production speeds are up to 35/min with 36 x 48" cartons . . . to 60/min with smaller sizes. Magazine feeding system has 150-carton capacity.

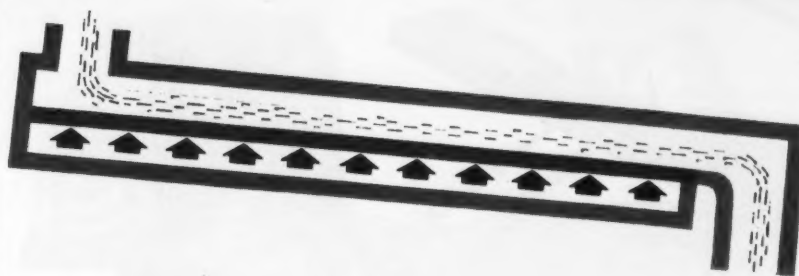
Rubber roll runs constantly in ink bath, then comes in contact with engraved steel metering roll, hard-chrome plated and polished for long life even at high speeds. Metering roll in turn applies ink film to precision rubber type on roller made of specially cured and ground rubber.

(Flexo-Printer is development of Industrial Marking Equipment Company, Inc., 257 W. 38th Street, New York 18, New York.)

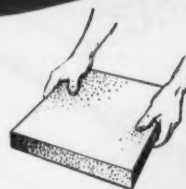
Check 3547 opposite last page.

# AIR-FLOAT

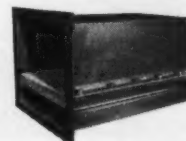
the better-built, more efficient  
air-gravity conveyor  
provides the answers to  
Dry Solids Conveying



The special porous plate is exclusive with KENNEDY AIR-FLOAT. It is strong, resistant to abrasion and temperature and has a smooth surface texture.



Sections are ruggedly designed, formed on modern production equipment and completely assembled before shipment.



#### **Q. How does AIR-FLOAT work?**

**A.** The dry material to be conveyed is fed on to a smooth, rigid, porous plate through which low pressure air continuously diffuses. Because the conveyor is inclined about 6 to 8°, the aerated material flows by gravity.

#### **Q. What distinguishes the KENNEDY AIR-FLOAT from other air-gravity conveyors?**

**A.** Primarily, the special porous plate. Also the casing is of heavier construction, flanged and channeled for greater rigidity.

#### **Q. How is this special plate better than other porous media?**

**A.** The AIR-FLOAT porous plate has literally millions of tiny pores through which the air diffuses uniformly for thorough aeration of the conveyed material. The plate is thicker, stronger, temperature- and wear-resistant, and has a very smooth surface texture.

#### **Q. How does this improve conveying?**

**A.** AIR-FLOAT has a much higher capacity than competitive air-gravity conveyors. Blind spots are eliminated and the angle of inclination is less critical.

#### **Q. What about maintenance?**

**A.** The KENNEDY AIR-FLOAT is the nearest thing to a completely maintenance-free conveyor that has ever been devised.

#### **Q. Can turns be made?**

**A.** Direction changes up to 45° are made with standard pieces. These can be combined for greater angles.

#### **Q. Are accessories available?**

**A.** Yes. End and side discharge boxes, splitters, control gates, transitions, bin extractors and required blowers can be provided.

#### **Q. Have KENNEDY AIR-FLOAT Conveyors been fully tested and proven?**

**A.** Yes. For more than 12 years AIR-FLOAT Conveyors have been successfully used in KENNEDY-designed cement and lime plants. With this background of experience, KENNEDY is now making AIR-FLOAT available to industry, mass producing it to sell at competitive prices.

For more information on AIR-FLOAT, ask for Bulletin 58-K.



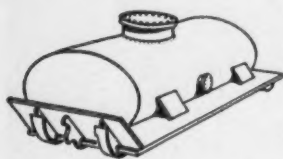
## KENNEDY VAN SAUN

MANUFACTURING & ENGINEERING CORPORATION  
405 PARK AVENUE, NEW YORK 22, N.Y. • FACTORY: DANVILLE, PA.

Check 3548 opposite last page.

# One **DINOSAUR** With Detachable Containers Solves Many Complex Materials Handling Problems

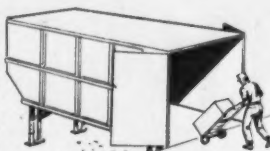
TANK CONTAINERS



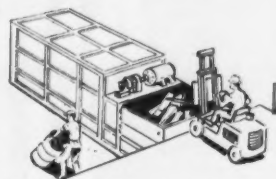
PORTABLE HOPPERS



VAN TYPE



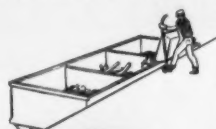
REFUSE COMPACTION



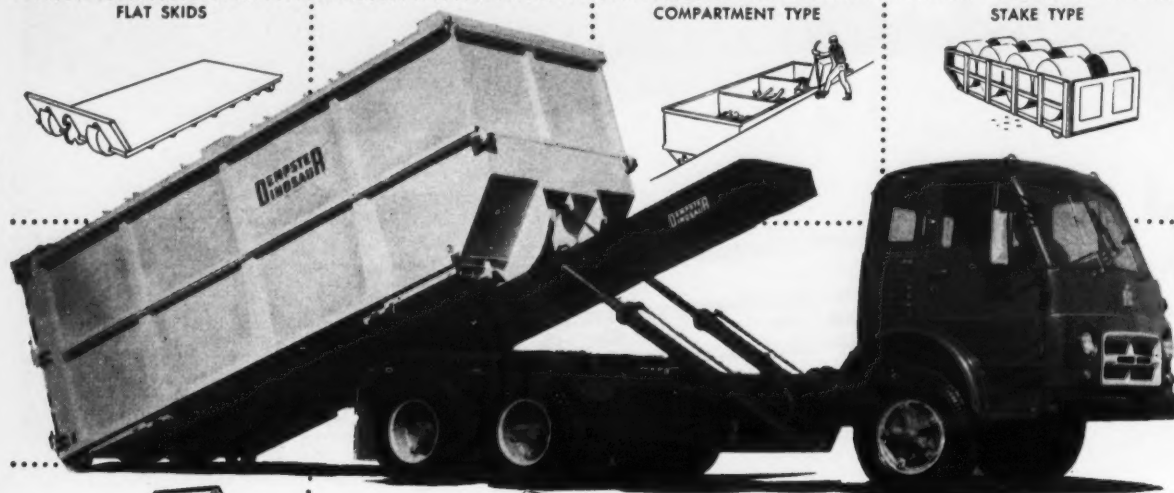
FLAT SKIDS



COMPARTMENT TYPE



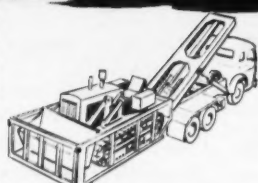
STAKE TYPE



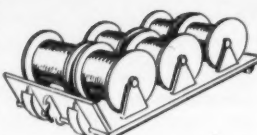
DUMP BODIES



HEAVY EQUIPMENT CARRIERS



CABLE REEL MOUNTS



PORTABLE FIELD OFFICES



Patents Pending

Here's the materials handling tool that takes up where the fork-lift truck leaves off. Gigantic loads can be placed on skids, in tanks or containers. The **DEMPSTER-DINOSAUR** picks them up . . . automatically . . . in seconds . . . and whisks them to their destination, in-plant or to over-the-road locations. Here they are put down, intact . . . pushed off on a dock . . . left on telescopic legs . . . or dumped.

One truck handles any number of containers of many types. Value of truck is multiplied . . . standing-idle time is eliminated . . . loading and

handling is cut to the minimum. One man, the driver, handles the all-hydraulic operations without leaving the cab.

Containers available up to 40 cu. yds. and over . . . loads are limited only by the capacity of the truck. If you have a special problem send it in.

**Write for FREE BROCHURE**  
**DEMPSTER BROTHERS**  
Inc.

Knoxville 17, Tennessee, Dept. CP-2

## HANDLING & PACKAGING

**Loading, unloading faster with floor conveyor kit for trailer body**

**Uses:** Mounted to floor of van body or trailer, conveyor "walks" palletized-unitized loads in or out of body.

**Features:** Reported to cut loading time in half. Two or three fork trucks can be kept busy just feeding or relieving the floor conveyor.

**Description:** Conveyor is



"Moving floor" of van speeds unloading of these palletized oil drums

pushbutton-activated. Kit consists of 1) conveyor-chain channel assembly which runs full body length and is powered by 12v battery (or optional 220v system); 2) four aluminum tracks, two on each side of conveyor-chain channel assembly, running full body length; and 3) floor segments of thick plywood on the bottom of which are fastened rollers which run in the tracks.

A hook on the floor segments engages the conveyor chain, moving the segment back and forth on the tracks. Thus, these segments serve as a movable false floor on which the pallets are placed.

(The Moto-Vator is a product of H. S. Watson Company, 1316 67th St., Emeryville 8, California.)

Check 3550 opposite last page.



To: **DEMPSTER BROTHERS**, Dept. CP-2  
Knoxville 17, Tennessee

Please send free Dinosaur Brochure

Name \_\_\_\_\_ Title \_\_\_\_\_

Firm \_\_\_\_\_

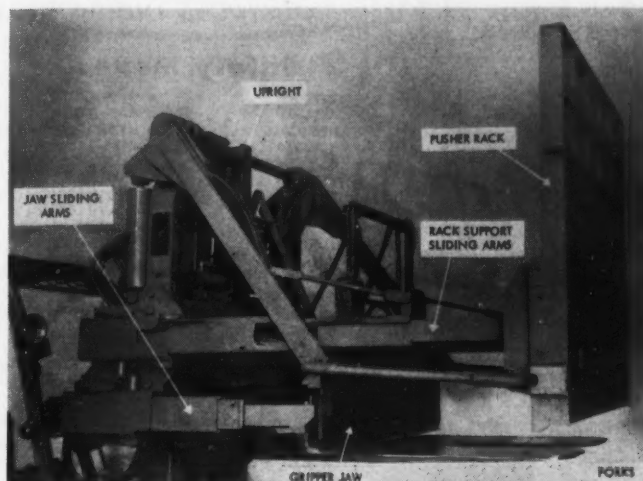
Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

Check 3549 opposite last page.

## MATERIAL HANDLING and PACKAGING



To pull load-carrying sheet onto forks, truck operator opens gripper jaws. This automatically connects the jaw and pusher rack so that they operate simultaneously. Pusher rack and jaw are extended to the desired point. The jaw is closed on the sheet. Pusher rack and jaw are retracted to pull sheet onto the forks. When both are fully retracted, the jaw automatically latches the main frame of attachment, so that pusher rack and jaw then operate independently.

At unloading point, pusher rack is extended while jaw remains retracted and closed on sheet. This pushes the load off the sheet. Another way of unloading is to place load in the desired final position, with jaw gripping the sheet, and extend pusher rack. In effect, this pushes the fork truck away from the load.

All controls for these actions are hydraulically activated, with control levers placed on the fork truck cowl within easy reach of operator.

### Palletless handling attachment . . .

## Retrieves its own load-carrying sheets

A FORK truck attachment which retrieves the load-carrying sheets used in palletless handling overcomes the previous disadvantage of the "Pul-Pac" method of palletless handling — loss of the sheet at final destination.

In this method, load-carrying sheet is pulled onto the truck's forks by a gripper jaw. Load removal is accomplished by a pusher rack, which pushes both load and load-carrying sheet off the forks.

Since there had been no method for pulling the sheet out from under its load, and since most such palletless handling operations are sizeable, the loss of the sheets involved a significant figure.

Unique design of new attachment — which permits the gripper jaw and pusher rack to act simultaneously or independently of each other (note photo and caption above) — is reason for the device's retrieving ability.

Load-carrying sheet may be retrieved either by pulling it from under its load, after load has been deposited, or pushing the load off the sheet while both load and sheet still are on forks of truck.

With the attachment, a fork truck can be used for five separate operations: 1) sheet-retrieving "Pul-Pac" operation; 2) standard "Pul-Pac" operation without sheet retrieving; 3) standard pusher operation,

## With an Allis-Chalmers 6,000-lb Pneumatic you can...

## MEASURE the dollar-saving difference

...in inches — stacks to a height of 128¼ in., highest of them all with standard mast. Its 106¼-in. length (less forks) is the shortest.

...in pounds — 10,250 lb of balanced stability — most rugged truck in its class.

...in percent — climbs a 30-percent grade fully loaded. This is more than the gradability of any other 6,000-lb pneumatic — proof of its superior power-weight-balance combination.

...in hours — based on the experience of users, 10,000 hours or more before major engine overhaul is about par for the course. The heavy-duty industrial engine is designed specifically to work under lift truck conditions.

Let your Allis-Chalmers dealer show you how you will be dollars ahead by *any* unit of measure with an Allis-Chalmers lift truck. He will be glad to demonstrate. Allis-Chalmers, Milwaukee 1, Wis.



The Allis-Chalmers 6,000-lb pneumatic lift truck is available with choice of single or dual front wheels—standard or POWER SHIFT transmission — diesel, gasoline or LP gas engine — plus power steering and many other optional accessories.

## ALLIS-CHALMERS

BH-125D



Check 3551 opposite last page.



## MORE QUALITY ENGINEERED FEATURES IN STEPHENS-ADAMSON CARRIERS



Series # 200 Carriers

Series #700 Carrier

### ADVANTAGES

- Spun-end roller assemblies and parts interchangeable for quick installation.
- One-Piece, all-steel, welded frame construction.
- Positive lubrication . . . pre-lubricated at factory . . . provisions for field lubrication.
- Roller brackets tilt two degrees in direction of travel for greater belt training effect.
- Die-cast labyrinth bearing seals keep grease in . . . dust and dirt out.

Pneumatic "Impact" Carriers



**WRITE FOR BULLETIN 355**  
**STANDARD PRODUCTS DIVISION**  
**STEPHENS-ADAMSON MFG. CO.**  
11 RIDGEWAY AVENUE • AURORA, ILLINOIS  
PLANTS LOCATED IN: LOS ANGELES, CALIFORNIA  
CLARKSDALE, MISSISSIPPI • BELLEVILLE, ONTARIO

Check 3552 opposite last page.

## STAINLESS STEEL CONVEYOR SCREWS

4", 6", 9", 12" DIA.



*for immediate  
delivery*

STOCKED IN TWO STYLES

- Continuous Welded and Polished
- Industrial Finish

**M-H STANDARD CO.**

514 Communipaw Ave., Jersey City 4, N. J.

Other  
M-H  
Products

VERSABAR Metal Framing,  
ARMORBELT Metal Belt Conveyor,  
MONOFLO Rotating Cable Conveyor

Check 3553 opposite last page.

## HANDLING & PACKAGING

where load is pushed off forks (with no sheet required).

Also, 4) regular fork truck operation with standard wooden pallets (with pusher rack and gripper jaw fully retracted); 5) chisel-fork truck operation, where load is picked up by sliding chisel forks under it, (with pusher rack and gripper jaw fully retracted).

Controls for all operations are hydraulically activated with control levers placed on fork truck cowl within easy reach of operator.

Optional equipment for attachment includes a side-shifting device and a Plexiglas facing for the pusher rack.

(Model 5000 Sheet Retrieving Pul-Pac has been introduced by Clark Equipment Company, Industrial Truck Division, 1921 Escote St., Battle Creek, Michigan.)

Check 3554 opposite last page.

### Design helical-gear drive for screw conveyors

Rapid drive-shaft removal assured by snap ring

Uses: Helical-gear drive is made especially for screw-conveyor installations.

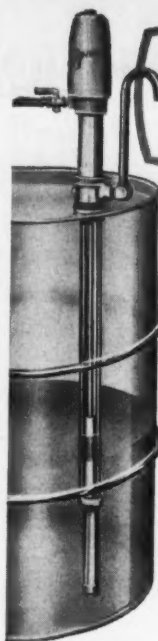
Features: Drive shafts are removable by quick snap-ring arrangement—without disturbing reducer or screw in many installations. Tapered roller bearings in reducer absorb thrust, eliminating need for separate thrust bearing on trough end.

Description: Compact drives are in six sizes, each with ratios of 4:1, 9:1, 14:1 and 24:1, for conveyors requiring ½ to 30 hp. Basic drive can be combined with standard trough end as well as with manufacturer's all-steel pre-drilled motor mount.

Trough ends, in eight sizes from six to 20", bolt to any standard trough. Choice of seals is offered between conveyor and reducer.

(Screw-conveyor drives are made by Dept. 255, The Falk Corporation, Box 492, Milwaukee 1, Wis.)

Check 3555 opposite last page.



**NOW! FAMOUS *Fast-Flo***  
**PUMP AVAILABLE IN**  
*Stainless Steel*

**Safely move...**

- ACETONE
- CATSUP
- CHEMICALS
- CHOCOLATE
- COSMETICS
- DETERGENTS
- DYE STUFF
- FATTY ACIDS
- FREON
- GLUE, LATEX
- GLUE, WOOD
- HAIR TONIC
- HYDROFLUORIC ACID
- INKS
- LACQUERS
- MUSTARD
- PHOSPHORIC ACID
- SHAVE LOTION
- SEALERS
- SOY SAUCE

The new Stainless Steel Fast-Flo Pumps by Graco are now pumping and dispensing these and other corrosive, "handle-with-care" liquids and semi-fluids . . . quickly, safely and direct-from-drum!

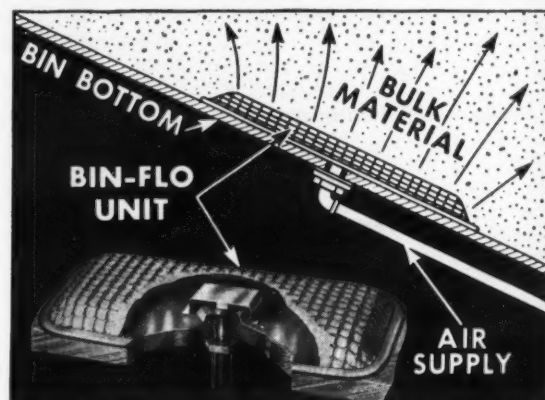
Say goodbye to spillage and waste, eliminate danger of contamination to your expensive liquids and semi-fluids. Investigate this new Stainless Steel air-powered Fast-Flo Pump by Graco!

**WRITE FOR LITERATURE TODAY!**  
**OR SEE YOUR LOCAL INDUSTRIAL DISTRIBUTOR**

## GRACO *Fast-Flo* "DIRECT-FROM-DRUM" PUMPS

GRAY COMPANY, INC. • Engineers and Manufacturers  
22 Graco Square, Minneapolis 13, Minnesota  
FACTORY BRANCHES: New York (Long Island City) • Philadelphia •  
Detroit • Chicago • Atlanta • Houston • San Francisco  
SALES OFFICES: Washington • Toronto

Check 3556 opposite last page.



**BIN-FLO** USES SMALL VOLUME  
OF AIR AT LOW  
PRESSURE  
**KEEPS BULK MATERIALS MOVING**

BIN-FLO units in bins, chutes, hoppers, etc., restore flow characteristics to dry, finely ground materials which tend to pack or bridge in storage. Types for all materials and conditions. No moving parts; simple installation; negligible operating cost; no maintenance cost.

BIN-DICATOR the original diaphragm-type bin level indicator. In successful use for over 20 years. ROTO-BIN-DICATOR new, motor-driven paddle type; excellent on bins under pressure or vacuum, and for general application. Also explosion-proof units, U.L. listed.

**THE BIN-DICATOR CO.**  
13946-D Kercheval • Detroit 15, Mich.

Write for detailed literature  
or call  
VALLEY 2-6952

**WE SELL DIRECT • PHONE ORDERS COLLECT**

Check 3557 opposite last page.

CHEMICAL PROCESSING

THAT'S  
INTERESTING

### Library searcher

Computer-like searching selector is being developed which will be capable of searching entire scientific literature of world in 112½ hr.

General Electric Co. is developing high-speed version of searcher now in use at Western Reserve University. New model will search 100,000 abstracts an hour compared to 30 by present.

### Brushless toothpaste

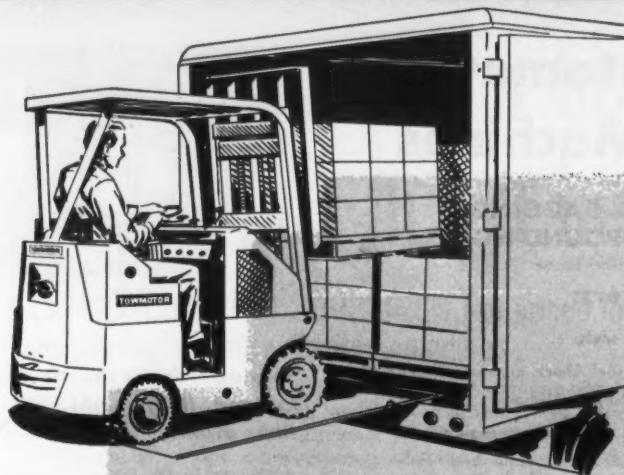
Pop this tablet into your mouth, crush it with your teeth, swish the resultant foam around your teeth for 30 seconds, and expectorate!

Presto! You have brushed your teeth — without water, brush or toothpaste. That's what they say a new brushless tablet dentrifice will do. Named Foam-Ettes, it is product of Chemical Products Corp.

For more information on product at right, specify 3558 see information request blank opposite last page.



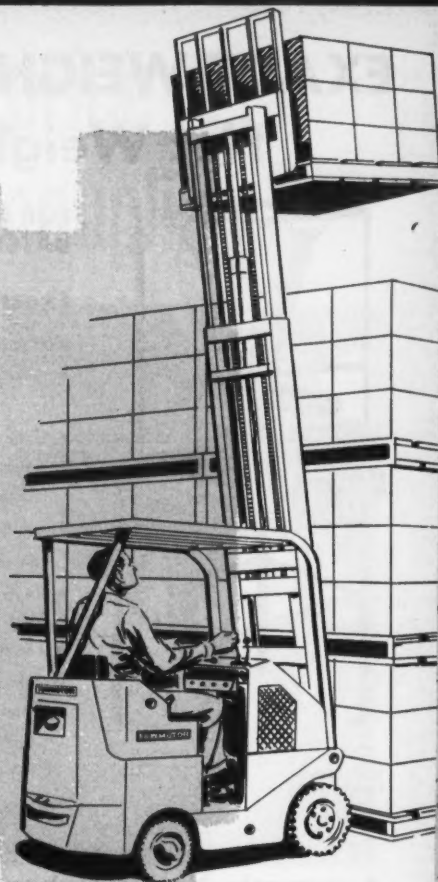
FEBRUARY 1960



**LOW CEILING!** Less than six feet high, this Model 410 safely enters low-headroom vans, trailers, trucks and boxcars. And the new Towmotor High Free Lift Triple Mast—providing 65" of "free lift" at 180° of lift—permits floor-to-roof loading!



Introducing  
Towmotor "Van-Stack"  
Series Fork Lift Trucks



**HIGH CEILING!** Same fork lift truck stacks ton-loads of materials onto 12-foot tiers. Standard Towmotor Overhead Guard offers extra protection for operator. (Other models in "Van-Stack" series handle loads up to 3000 pounds.)

## New Towmotor does double duty!

You'll profit in many extra ways by owning a new Towmotor "Van-Stack" Series Fork Lift Truck.

"Almost unbelievable—but I saw it!" said an amazed MHI Show-goer who witnessed this double-duty lift truck in action in June. Thousands saw it drive in low-headroom trailer, load it to roof, then stack heavy units on 12-foot high tiers.

This truck (only 32" wide) zips through congested 3-foot aisles—maneuvers sharp corners—hustles big

loads indoors and out—and enters elevators for fast floor-to-floor service.

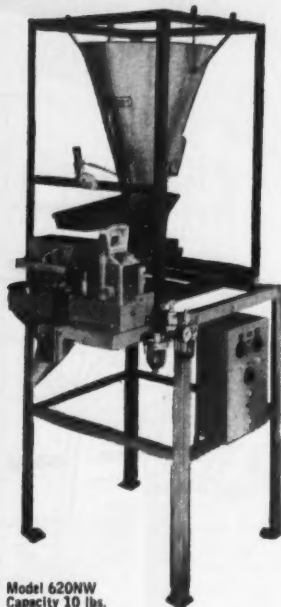
On top of all this, its increased hoisting speed, dual-entry convenience, powerful 4-cylinder "economy" gas or LP-gas engine, weatherproof instrument panel—and other exclusive Towmotor features—make it the foremost fork lift truck in 2000-3000 pound class! Ask for "Van-Stack" Series Folder SP-25. Write Towmotor Corporation, Cleveland 10, Ohio.



LEADERS FOR 40 YEARS IN BUILDING  
FORK LIFT TRUCKS, CARRIERS AND TRACTORS

Gerlinger Carrier Co. is a subsidiary of Towmotor Corporation

# EXACT WEIGHT Automatic Net Weighing Machines



Model 620NW  
Capacity 10 lbs.

## FOR PACKAGING, BAGGING, BATCHING, COMPOUNDING

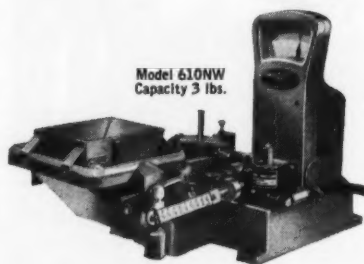
### Exact Weight offers:

- Precision industrial-type scale.
- Over-under indicator visual check eliminates need for separate checkweighing operation.
- Calibrated adjustments with counterweights of known value; graduated beam, poise and scale indicator.
- Design backed by 45 years of experience in specialized weighing equipment.
- Readily accessible service and maintenance facilities.
- Performance guaranteed in writing.

Weighs and feeds any dry, free-flowing materials . . . fast and accurate operation . . . helps cut production costs. Write for Bulletin 3318 for details and specifications.

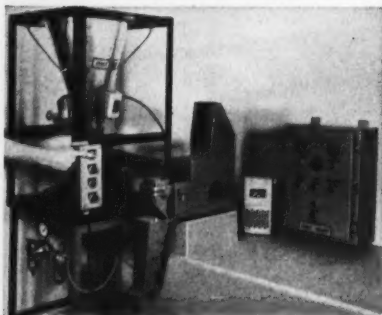
## Automatic Net Weigher

Net Weigher can be supplied without the feeder machine, support frame and discharge chute. The unit may be adaptable to your specific operation. Write for Bulletin 3311.



Model 610NW  
Capacity 3 lbs.

## Precision Automatic Net Weighing Machine

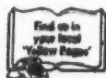


Model 4601 NW, left, for weighing dry products with accuracies of 1/10 gram on quantities below 10 grams and one percent accuracy on quantities of 10 grams and above. Combines a high-accuracy Shadograph Scale, air-operated dump mechanism, hoppers, vibratory feeders and photoelectric controls. Models with capacities from 50 grams to 500 grams. Write for Bulletin 3363.



**THE EXACT WEIGHT SCALE CO.**  
905 W. FIFTH AVE., COLUMBUS 8, OHIO  
In Canada: 5 Six Points Road, Toronto 18, Ont.

Sales and Service Coast to Coast

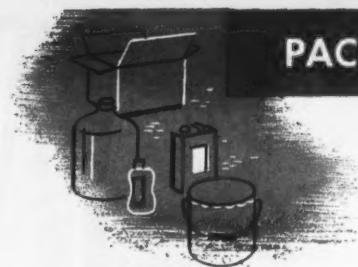


**BETTER QUALITY CONTROL . . . BETTER COST CONTROL**

Check 3559 opposite last page.

## PACKAGE IDEAS

Latest developments  
in packages  
and their design



### Ship anhydrous caustic in lined, lightweight fiber drums

The Dow Chemical Company is now shipping anhydrous caustic and sodium orthosilicate in polyethylene-lined fiber drums weighing 30% less than previous conventional containers. Drums have full-open head design for easy opening, emptying. Pressure-sensitive color-coded labels are placed on top cover to preserve the drum's salvage value.

Adequate barring of moisture vapor is assured by polyethylene extrusion coating on aluminum foil which is laminated to inside of the fiber drum, plus liquid-tight bottom construction. Another big advantage: no contamination from iron, rust or paint.

(Drums were supplied by Fibre Drum and Corrugated Box Division, Continental Can Company, 530 Fifth Ave., New York 36, N. Y.)

Check 3560 opposite last page.



### Plastic container

. . . is introducing Purex Corporation's (South Gate, Calif.) liquid detergent to eastern markets. Marketing advantages: designed for firm handhold, even with wet hands; pastel color harmonizes with modern kitchen decor; bottle won't break, scratch, leave rust rings.

Of immediate advantage to Purex is the light weight of container, meaning savings in shipping and handling.

(Container is made by Plax Corporation, PO Box 1019, Hartford, Conn.)

Check 3562 opposite last page.



### One-trip shipping

. . . of liquid chemicals is use for this lightweight five-gallon polyethylene container which is self-contained in its own fiberboard box and equipped with recloseable closure. The plastic container, made by Chippewa Plastics Company, division of Rexall

### Aerosol detergent

. . . for dish-washing chores is metered out in 1/4-oz shots with each button push. Now



being offered in 16-oz container, each of which gives "64 sinkfulls of suds," the product can be packaged in other sizes too. Various perfumes can be added and colors developed to suit a marketer's needs.

(Spray detergent is product of Par Industries, Inc., 2193 E. 14th St., Los Angeles 21, California.)

Check 3563 opposite last page.

#### NEW LITERATURE

Material Handling  
and Packaging

**Automatic weighing systems**—Components and complete systems for automatic batch and continuous weighing are fully covered in 24-page catalog. Spiced with many photographs and explanatory diagrams, literature touches upon theory of automatic weighing, how the various components fit into the system, and also describes and pictures weigher-feeders, belt-conveyor scales, check-weighing systems, automatic process control through weighing. Cat 14—Weighing & Control Components, Inc.

Check 3564 opposite last page.

**Aerosol-propellant blending methods** are analyzed in four-page reprint of paper presented before CSMA. Five blending systems are discussed: weigh tank, proportioning pump, displacement meter, density measurement by radiation equipment, continuous proportioning. "Blending of Aerosol Propellants"—Union Carbide Chemicals Company, Division of Union Carbide Corporation.

Check 3565 opposite last page.

**Bulk scale** that automatically weighs, discharges and records dusty, powdered, small-size granular materials is specified in data sheet. Scale handles loads from 200 to 600 lb per discharge. Product Data Sheet 5902—Richardson Scale Co.

Check 3566 opposite last page.

**Drum handler** for fiber and steel drums is introduced in four-page brochure. Shows how unit is mounted on lift truck so that it can handle one or two drums at a time. Grip-O-Matic Brochure—Little Giant Products, Inc.

Check 3567 opposite last page.

# You can find a bigger price . . . but not a better coupling

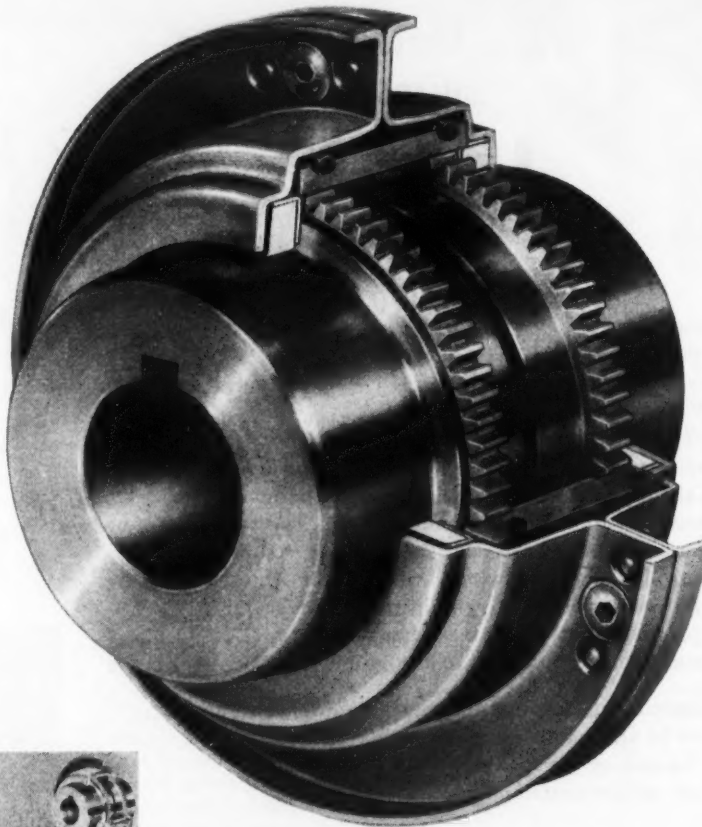
## LINK-BELT MOTOR COUPLINGS are priced low among high-quality flexible couplings

Here's your best value in the flexible coupling field . . . an ideal, low-cost answer for such motor-driven equipment as pumps, compressors, speed reducers and generators.

Besides substantial first savings, you realize the economies of fast, easy assembly and servicing. Allen head, spiral cam fasteners, which open and close with only a quarter turn, are a permanent part of the cover . . . no loose nuts or bolts.

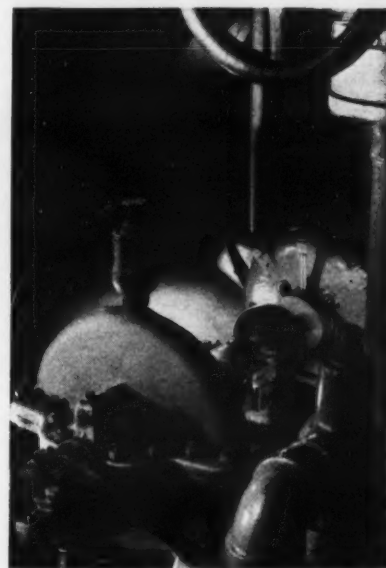
There's economy in performance too. Geared design assures high capacity and durability . . . torque transmitting parts are accurately machined from cold-rolled steel. Especially important, compensation for both angular and parallel misalignment is **FREE**—i.e., without imposing loads on shafts and bearings.

Link-Belt Motor Couplings are immediately available off-the-shelf for shafts up to 2½".



**FOLDER 2875** has complete information. For your copy, write your nearest Link-Belt office or authorized stock-carrying distributor.

**LINK-BELT COMPANY:** Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Warehouses, District Sales Offices and Stock Carrying Distributors in All Principal Cities. Export Office, New York 7; Australia, Marrickville (Sydney); Brazil, Sao Paulo; Canada, Scarborough (Toronto 13); South Africa, Springs. Representatives Throughout the World.



### NEW!

#### CORROSIVE-DUTY COVER



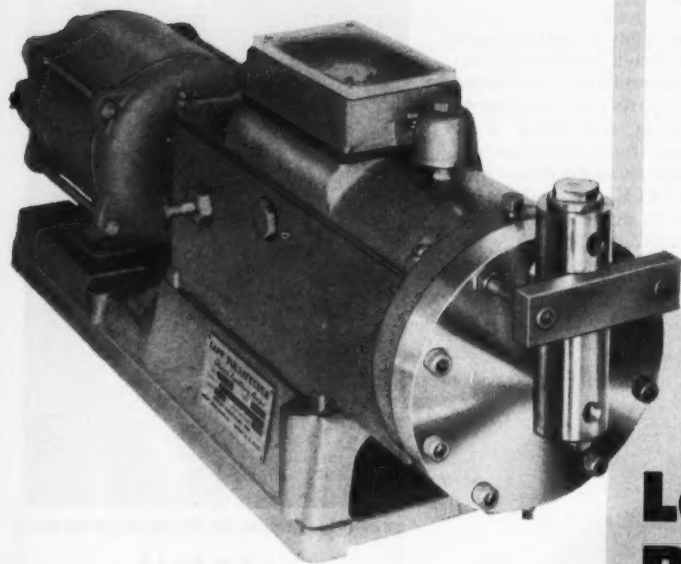
This new cover provides positive protection for Link-Belt Motor Couplings against damaging effects of corrosive attack. Construction includes stainless steel fasteners, polyester fiber seals.

## LINK-BELT

GEARED FLEXIBLE COUPLINGS

Check 3568 opposite last page.

**These fluids are  
difficult to meter...**



The Lapp Pulsafeeder is a highly-specialized, precision pump suited to a wide variety of special applications involving controlled-volume pumping of fluids. It's a combination piston-diaphragm pump having a hydraulically balanced diaphragm and a closed hydraulic system. The reciprocating piston action provides accuracy of positive displacement while the diaphragm isolates liquid being pumped from the pump's working parts. Eliminates need for stuffing box or running seal . . . prevents product leakage and contamination. Pumping speed is constant, variable flow results from variation in piston-stroke length . . . controlled manually by hand-wheel, or, in Auto-Pneumatic models, by instrument air pressure responding to any instrument-measurable processing variable. Pulsafeeder capacities range from 585 ML per hour up to 24 gpm maximum flow and pressures from minus atmospheric to 6800 psig.

Specify Lapp Pulsafeeder when you need continuous (or intermittent) pumping, at accurately controlled volume, of fluids which cannot be satisfactorily exposed to conventional pistons, cylinders and stuffing box packing. Or because of the corrosive action of chemicals and/or the need for protection of product against contamination.

**Lapp**

**WRITE FOR BULLETIN 59** containing typical applications, flow charts, description and specifications of models of various capacities and constructions. Lapp Insulator Co., Inc., Process Equipment Division, 3513 Poplar Street, Le Roy, New York.

Check 3569 opposite last page.

**FORMALDEHYDE  
MERCURY  
MOLTEN METALS  
SULFUR DIOXIDE  
HYDROBROMIC ACID  
SULFURIC ACID  
HYDROCHLORIC ACID  
LIQUID BROMINE  
LIQUID CHLORINE  
FLUORINE GAS  
HYDROFLUORIC ACID  
HYDROGEN FLUORIDE  
SULFUR DICHLORIDE**

**They are handled  
successfully by the**

**Lapp  
PULSAFEEDER  
CONTROLLED-VOLUME CHEMICAL PUMP**

## HANDLING & PACKAGING

**Car spotters and pullers**, commonly for moving railroad cars but also used for other mobile loads, are detailed in 20-page booklet. Fourteen two-color drawings depict typical layouts; engineering and selection data are given. Book 2892—Link-Belt Company.

Check 3570 opposite last page.

**Battery charger** for automatic single-shift charging of 12-cell, 24-volt industrial-truck batteries to 600 amp-hr capacity is fully described in two-page Bul AR-105—C & D Batteries, Inc.

Check 3571 opposite last page.

**Electronic scale instrumentation** components which can be combined to give various forms of complete weighing systems, including recording and/or indicating, are listed and briefly described in eight-page Booklet G-340—Streeter-Amet Company.

Check 3572 opposite last page.

**Casters and wheels**—Manufacturer's complete line is covered in 40-page catalog. Special two-page index simplifies checking of caster or wheel specifications for any particular application. Cat DP104—Rapids-Standard Co., Inc.

Check 3573 opposite last page.

**Case-packer**—"Atkron Dumore" continuous-motion unit for packing bottles, cans or jars up to 32 ounces in size has operation described and features discussed in four-page Brochure CP 701—Geo. J. Meyer Manufacturing Co.

Check 3574 opposite last page.

**Gravimetric belt feeder** for feeding over 3000 lb/min at accuracies to  $\pm 1\%$  is subject of four-page bulletin. Photographs and cutaways are included. Bul 35.20-2—B-I-F Industries, Inc.

Check 3575 opposite last page.

## NEXT MONTH

Manual methods of weighing out small bottles full of powders and tablets were slow and costly for Morse Laboratories, Hoboken, N. J. But they couldn't readily find the "right" combination of price and accuracy in several types of equipment they looked into for the job. Persistent searching did finally turn up a low-cost net-weighing and feeding device that more than paid for itself in less than a year of operation. Get the details in March CP, this section.



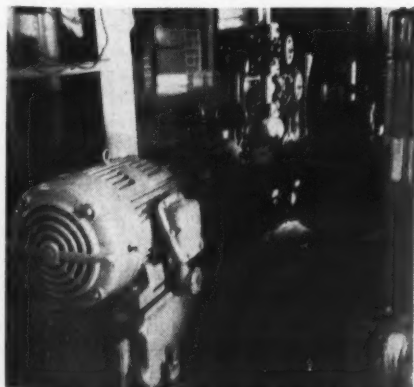
Centrifuge at Eli Lilly helps preserve product purity

Photos by CP Staff

## Center-slung centrifuge has trouble-free drive

Permits speed to be changed from 0 to 1000 rpm on centrifugal with alloy baskets and screens that control corrosion and keep product clean

GORDON WEYERMULLER, Associate Editor  
with DAVID HANCOCK  
Section Supervisor, Chemical Area  
Eli Lilly & Company, Lafayette, Indiana



Unlimited variation of speed provided by hydraulic drive allows easy loading, washing and unloading

**Problem:** Type of variable-speed drive used in the past on centrifuges at Eli Lilly plants were troublesome due to excessive maintenance. A centrifuge with a better drive was desired at the chemical plant of Eli Lilly in Lafayette.

A centrifuge was also required that would resist hydrochloric acid, acetic acid, acetic anhydride and dilute sulfuric acid. Maintenance of product purity was also a requirement.

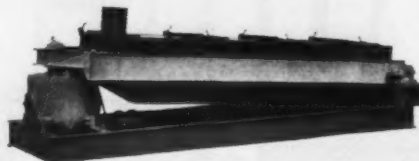
**Solution:** Two years ago the plant installed a center-slung centrifuge powered by an infinitely variable-speed hydraulic drive. Centrifuge is used to separate crystals from mother liquor, wash mother liquor out and replace it.

Centrifuge has a fume-tight cover for exhausting solvent and acid fumes. Baskets and filter screens are Hastelloy alloy B. This alloy will withstand corrosives involved and can be satisfactorily cast and welded. All electrical equipment is explosion proof.

Hydraulic drive consists of a variable delivery pump powered by a 20-hp electric motor. Speed of basket is governed

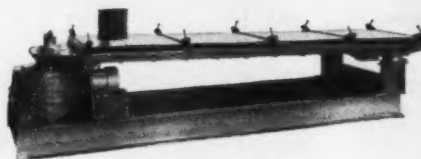
# ROTEX®

## SCREENERS and New Rotex COOLERS



### ROTEX SCREENERS

- Completely enclosed and dust tight.
- Quiet running, counterbalanced drive.
- Horizontal gyratory motion gives clean, accurate separations and high capacity.
- Heavy welded, steel construction.
- Low head room and fast screen changes.
- ROTEX Ball cleaners prevent screen blinding.
- Over 30 standard models with from 1 to 5 screen surfaces



### NEW ROTEX COOLERS

- Completely enclosed and dust tight.
- Well known, quiet running, counterbalanced ROTEX drive.
- Horizontal gyratory rotation keeps material in constant contact with entire cooling surface.
- Heavy, welded, steel construction with stainless steel interiors.
- Accessible interiors with rounded corners and smooth, polished surfaces to meet sanitary standards.
- High cooling efficiency in a low cost, sanitary, easy to clean production cooler.

ROTEX Screeners have been widely used for nearly half a century. Now we offer the new ROTEX Cooler. Write for information on your screening or cooling application. Our experienced engineers will be pleased to cooperate with you.

# ROTEX®

THE ORVILLE SIMPSON COMPANY  
1246 Keweenaw Street  
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Check 3576 opposite last page.



If your product is in this list

new **super** series **MILLS**

will multiply your production  
in less space at less cost.

There is a world for every mill... a laboratory factor is big volume production.

IT'S THE ADVANCED  
ENGINEERING  
THAT MAKES THE  
BIG DIFFERENCE  
IN:

GRINDING  
DISPENSING  
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Let us send you  
the 1960 plant  
booklet.

Write today for  
brochure.



**FOOD** and kindred products including meat, dairy, fruit, vegetable, fish, bakery, confectionery, cooking fats, extracts, food preparations, etc.

**TOBACCO** end-products.

**TEXTILE** dyes, finishes and coatings.

**LUMBER & WOOD** coatings.

**PAPER** coatings and glazes.

**PRINTING** inks.

**CHEMICALS** and kindred products including organic and inorganic chemicals, drugs, medicines, pharmaceuticals, cosmetics, cleaning and polishing preparations, waxes, fertilizers and insecticides, etc.

**PAINTS, VARNISHES, LACQUERS, ENAMELS** and similar coatings.

**PETROLEUM** products including greases, oils, roofing materials, fuels, etc.

**LEATHER** dyes, special polishes, etc.

**STONE, CLAY and GLASS** Products.

**CERAMIC** slips, body materials and glazes.

**METAL** core washes, mold coatings and special protective coatings.

**MISCELLANEOUS** including pencils, crayons, carbon paper coatings, cork products, matches, etc.

**RESEARCH LABORATORIES** and similar services.



**MOREHOUSE-COWLES, INC.**

1150 San Fernando Road  
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Representatives in principal cities  
Convenient lease and time payment plans

**PROCESSING EQUIPMENT**

by volume of oil delivered to hydraulic drive by pump. Belt connects hydraulic drive to spindle of centrifuge. It is continuously variable from 0 to 1000 rpm (rated rpm for centrifuge) with full control of accelerating and decelerating speed. Regenerative braking is automatic.

**Results:** Big advantage of centrifuge is the hydraulic drive, which has been trouble-free. Centrifuge has successfully withstood corrosives encountered. Absence of corrosion products helps maintain high purity of chemicals being manufactured.

(Center-slung centrifuge is product of Tolhurst Centrifugals Div., American Machine and Metals, Inc., East Moline, Illinois.)

Check 3578 opposite last page.

(Hydraulic drive for centrifuge was supplied by Oilgear Co., 1560 W. Pierce St., Milwaukee 4, Wis.)

Check 3579 opposite last page.

(Hastelloy alloy B is product of Haynes Stellite Company, Div. of Union Carbide Corp., Kokomo, Ind.)

Check 3580 opposite last page.



"Go get some penetrating oil!"

Check 3577 opposite last page.

## PROCESSING EQUIPMENT

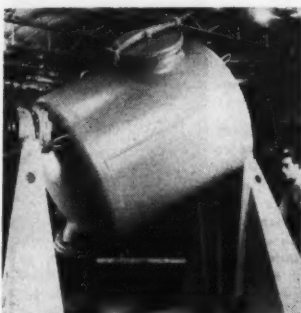
### Unjacketed glassed-steel dry product blender announced

All interior surfaces have smooth, fired, glass finish

**Uses:** Blending dry products in chemical, pharmaceutical, and allied industries.

**Features:** Units are reported to be the first unjacketed, glassed-interior, dry product blenders commercially produced. All interior surfaces have smooth, fired, glass finish.

**Description:** Low-voltage test glass finish is used for all surfaces. Product is not exposed to metal during any phase of blending process.



All interior surfaces of blender have low-voltage test glass finish

Smooth finish prevents materials from adhering or building up on surfaces. Interior can be easily cleaned by simply flushing with water.

Blender is equipped with quick-opening port for loading or inspecting product. Surfaces of port are also glassed. Discharge opening is located at lowest point in blender. Butterfly valve is available for this purpose.

Blenders are available in 4, 30, 60, 100 and 250 cu ft working capacities. All models are equipped with variable-speed drives so that blending conditions can be tailored to best suit individual products and process conditions.

(Further information about Chemo-Blender may be obtained from The Pfaudler Co., Division of Pfaudler Permutit Inc., 1100 West Avenue, Rochester, New York.)

Check 3581 opposite last page.

**ALL sizes**  
from 1 sq. ft. to 1000  
sq. ft. filtering area.

**ALL styles**  
flush plates & frames  
• recessed plates •  
hollow plates • solid  
center plates • retain-  
ing ring, gacking ring  
& grooved joint plates.

**ALL materials**  
cast-iron • aluminum  
• bronze • lead • nickel  
• rubber • stainless  
steel • wood • glass  
reinforced resins, etc.

**Performance  
PROVED  
throughout  
ALL industries**

**SPERRY**

## in ALL ways...the simplest, most economical means of superior filtration!

Recognizing that no single type filter press will satisfy all requirements, Sperry makes available the broadest combinations of design features to help you achieve maximum efficiency and economy.

Briefly—the Sperry Filter Press can be equipped with any type of plates—made of virtually any material—to handle any filterable mixtures—and most filter media—over a wide range of temperatures, pressures and capacities—with center, side or corner feed—open or closed delivery—for filtration of liquids, recovery of solids, clarification and decolorizing.

Sperry also manufactures a complete range of plate shifting and closing devices—enabling one man to control the entire operation.

*All this—at low first cost, low depreciation and minimum maintenance! Write for details or mail coupon for free Sperry catalog.*

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Company

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Check 3582 opposite last page.

# SHEAR-FLOW



**the  
modern  
mixer  
with  
power  
shearing**

Finer, faster blending, dispersing and homogenizing is now possible with Shear-Flow's new Model RL Hi-Shear Head. Finely spaced dual impellers induce considerable shearing action and high pumping pressures that rapidly reduce particle size for superior material mixtures.

- Greatly reduces mixing time
- Uniform circulation—no vortex
- Emulsifies immiscible liquids
- Controllable flow pattern
- All parts stainless steel
- Chemically inert seals
- Handles viscous materials with ease
- No operating Torque
- Disperses, blends, homogenizes

**GABB SPECIAL PRODUCTS INC.**  
Windsor Locks, Conn.

- ☐ Have representative call  
☐ Send more information

Name \_\_\_\_\_

Position \_\_\_\_\_

Co. & Address \_\_\_\_\_



Check 3583 opposite last page.

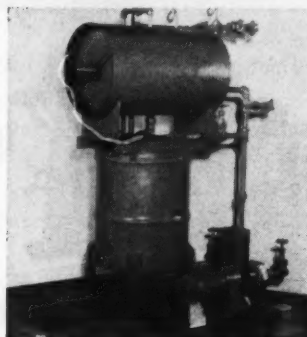
## PROCESSING EQUIPMENT

**Pressure-leaf filter  
fills need for low-cost  
experimental unit**

Uses: Conducting pilot plant or small production filtrations.

Features: Unit is low-cost, fulfills need for fully-equipped pressure-leaf, scaled-down, production filter.

Description: Experimental filter is available in capacities ranging from 10 to 30 sq. ft. Design consists of a flat-ended tank with fixed center discharge pipe on which leaves are placed. One bolt



Experimental filter (top) is shown complete with precoat tank, pump, and other accessories. Filter is shown with head cover removed

fastens lid, making it easy to open and close.

Smaller filter has 12" shell length and total of five leaves. Larger unit has 15 leaves, 27" shell length. Material of construction is either steel or 304 stainless steel. Prices start at about \$500.

(Experimental pressure-leaf filters are product of Hercules Filter Corp., 218 Ethyl Ave., Hawthorne, N.J.)

Check 3584 opposite last page.

**Heat transfer system  
designed as complete  
packaged unit**

Uses: Packaged unit is designed to provide liquid heat transfer for processes using jacketed equipment.

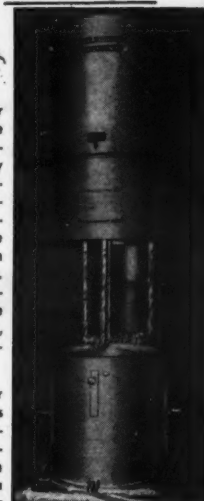
Features: Units are available for use with all types of heat transfer fluids. Automatic controls provide exact amount of heat required at tempera-

## FOR PROPELLANT... OR PLASTISOL\*



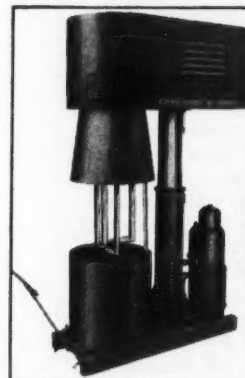
**ROSS DOUBLE PLANETARY**  
Change Can Mixers give better mixing in less time!

At *Thiokol* solid propellant plant in Elkton, Md., this Ross #130CDM variable speed 100 gallon Mixer produces the same high quality mix as obtained in Horizontal Double Arm Kneaders, and in 1/3 the mixing time.



With no bearings or stuffing boxes in the product zone, stationary can, completely enclosed mix, and remotely controlled raising and lowering device, the Mixers are as safe in operation as they are efficient. Mixers have low original and maintenance cost, are easy to clean, and extremely versatile in operation.

Lower illustration shows an 85 gallon #130-CDM Double Planetary Change Can Mixer furnished a leading concern for mixing plastisols of several types ranging up to 200,000 centipoises. Customer reports Mixer in operation 24 hours/day with mixing time per batch only 15-20 minutes; while the quality of mix and dispersion is so high that the final product is obtained in the Mixer alone — without further processing through a Three Roll Mill as was previously necessary with other Mixers.



Jacketed cans for heating or cooling material during mixing, dolly trucks, gates on cans for discharge, and vacuum tight covers can be provided.

\*—or any other heavy paste material. On paints, inks, pharmaceutical products, caulking compounds, and other similar materials.

the Ross Double Planetary Change Can Mixers mix and disperse up to 30 times faster than other Mixers.

Mixers available in 1, 2, 3, 4, 6, 8, 12, 20, 25, 65, 85, 125 and 150 gallon sizes. Write for complete information on these or other types of Ross mixing, grinding or dispersing equipment!

**CHAS. ROSS & SON CO., INC.**

Leading mfrs. of wet or dry grinding Mills, Kneaders and Mixers of all types — since 1869.  
154 CLASSON AVE., BROOKLYN 5, N. Y.

Check 3585 opposite last page.

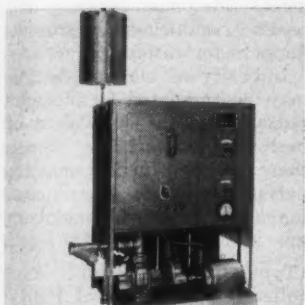
CHEMICAL PROCESSING



## PROCESSING EQUIPMENT

tures up to 600°F. Unit is factory assembled ready for installation.

**Description:** Automatic electric transfer system permits heating of heat transfer liquids at relatively low expense.



Automatic electric heat transfer system can be used with all types of fluids for temperatures up to 600°F

Electric emersion heaters provide source of heat. Gear-type pump equipped with oversize sleeve bearings, high temperature packing glands, and flanged connections, moves liquid through system.

All electrical equipment is prewired in single enclosed cabinet. System is electrically interlocked to prevent operation of heater without pump.

Units are available in either standard or explosion-proof construction. Cooling systems can also be included whenever desired.

(Automatic electric transfer systems are product of Per-Fab Company, Inc., 1246 Broad St., Bloomfield, New Jersey.)

Check 3586 opposite last page.

### **Dust, fumes at 550°F handled by glass-fabric dust collector**

**Uses:** High temperature fume and dust control.

**Features:** Use of glass filter fabric in collector permits application temperatures as high as 550°F. Air-jet cleaning minimizes wear, assures long filter tube life.

**Description:** Although dust collector is designed for use with glass filter fabric, it can also be used with other types.

Dust is collected on inside

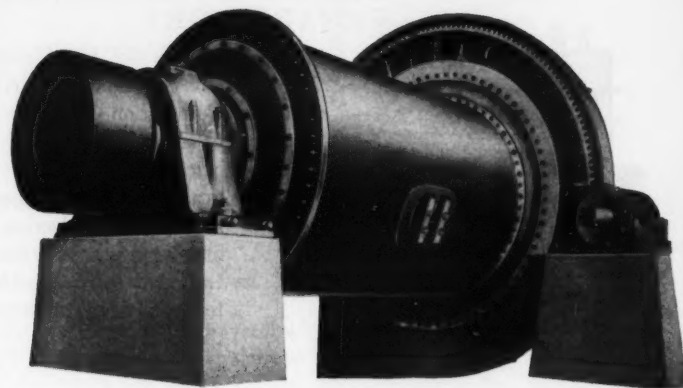
## **rugged dependable ball mills**



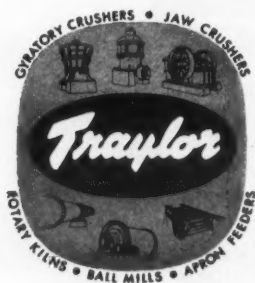
## **Traylor-made for greater profit**

Traylor Ball Mills are made in two types—overflow and diaphragm discharge. They are built for either wet or dry grinding.

Traylor Ball Mills feature shell liners of manganese or high carbon steel in plain, wave, cascade, lifter or Lorain types with shells of welded steel construction. Trunions are cast integrally with the detachable heads. Main bearings are made of Meehanite\* metal, larger sizes fitted with a high-pressure Alemite pump. Driving gears are steel, precision-cut on our Maag gear generator. Write for Bulletin No. 11-121 today!



Traylor Grinding Mills are available in Ball, Rod, Compartment and Tube Mills.



## **ENGINEERING & MFG. DIVISION OF FULLER CO.**

1517 MILL ST., ALLENTOWN, PA.

Sales Offices: New York — Chicago — San Francisco  
Canadian Mfrs: Canadian Vickers, Ltd., Montreal, P.Q.



Check 3587 opposite last page.

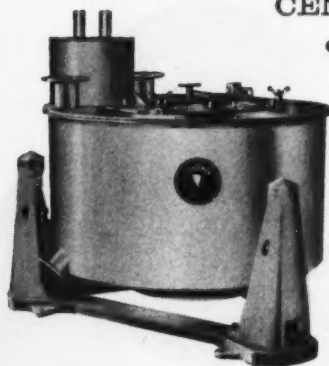


### \*DEWATERING FIBROUS PULPS

to residual moisture of 1% or less? ... or medium-to-coarse crystalline solids? The Sharples Conical screen Continuous Dehydrator most likely is the type of Sharples centrifuge best suited for this requirement and there are four sizes from which to choose, covering a range of capacities from a few hundred pounds to 75 tons per hour.

## for all types of solids deliquefaction\*

### \*NEED A RUBBER-LINED CENTRIFUGE?



or other special lining? The Fletcher Division of The Sharples Corporation offers a complete range of sizes of both batch and automatic vertical basket centrifuges—in the usual selection of metals, plus rubber covering and other linings for special corrosive conditions.

\* The term "Solids deliquefaction" is recognition by Sharples of the growing number of processes in which non-aqueous mother liquor and/or rinse are required, and to which such time-honored designations as "dewatering" and "dehydration" do not apply. Collectively the five different types of Sharples centrifuges are all-inclusive in function, hence, "solids deliquefaction."

## THE SHARPLES CORPORATION

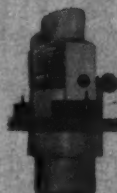
Centrifugal and Process Engineers

2300 WESTMORELAND STREET / PHILADELPHIA 40, PENNSYLVANIA  
NEW YORK • PITTSBURGH • CLEVELAND • DETROIT • CHICAGO • HOUSTON • SAN FRANCISCO • LOS ANGELES • ST. LOUIS • ATLANTA  
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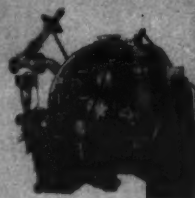
Check 3588 opposite last page.



\*Continuous removal or classification of solid particles from suspensions (4 microns in size upwards).  
*Super-D-Canters*



\*Removal of solid particles from suspensions at pressures to 150 psi. (4 microns in size upwards).  
*Vertical Super-D-Canters*



\*Deliquescence and efficient multiple washing of discrete solid particles—at pressures to 150 psi.  
*Super-D-Hydrators*



\*Deliquescence of fibrous and medium-to-coarse crystalline solids.  
*Continuous Dehydrators*



\*Broad range dewatering, recovery and washing of solids, liquid extraction and centrifugal filtering of liquids.  
*Fletcher Vertical Basket Centrifuges*



\*Concentration of finely divided or plastic solids.  
*Nozjectors*

### PROCESSING EQUIPMENT

surfaces of filter tubes which are cleaned by "pressure-jet" method. Simple jet inside each tube provides short blasts of high pressure air, alternating with a small amount of reverse airflow from main fan. This partially collapses tubes, cleans filter surfaces, and deposits residue into storage hoppers for disposal.

Intensity of cleaning action may be regulated from slight pulsation to the equivalent of mechanical shaking. Since there are no internal moving parts, stress and strain on casing and structural members are minimized.

(Type CO cloth tube dust collector is product of Pangborn Corporation, Hagerstown, Maryland.)

Check 3589 opposite last page.

### High production rates, low power requirements features of mill

Unit is capable of grinding low melting point products

Uses: Grinding or pulverizing wide variety of products in chemical, food, and allied industries.

Features: Machine is capable of high production rates with minimum power requirements. Operating temperatures inside mill are low. As an example, phenol formaldehyde resin, having melting point of about 185°F, can be processed without difficulty.

Description: Originally developed in Germany, the unit is essentially a combination impact and grinding mill. Of simple, rugged construction, the machine consists of five major components: 1) feeder, 2) air separator, 3) rotor, 4) liner, and 5) screen.

The feeding rotor rotates at 100 rpm. Device is a ball-bearing, oil bath, gear-ratio unit. Feed rate can be quickly adjusted by means of a lever. Feeder has transparent plastic cylinder which permits visual inspection.

Product discharged from feeder travels through air trap which collects foreign

## PROCESSING EQUIPMENT

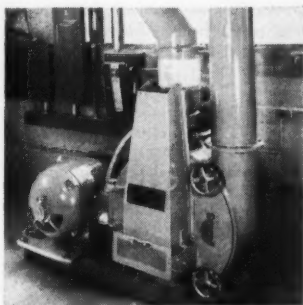
objects that might be present in feed. Separator does not require any magnetic devices.

Depending upon needs, mill's rotor consists of either four or eight blades. Device is of welded construction and rotates at 3600 rpm. End of blades are protected with abrasive-resistant steel plates.

Liner in mill is surfaced with  $\frac{3}{4}$ "-thick emery stone segments. Although these do eventually wear down, they always remain sharp, so that mill operating efficiency remains high. Changing of liners takes only matter of minutes.

Approximately 20 percent of liner surface is screen. Available in wide range of sizes, the screen is installed by simply inserting it in two slots.

Operating expense for mill is reported to be eight times lower than that of conventional grinding equipment.



Efficient centrifugal mill can grind phenol formaldehyde, having melting point of 185°F, without difficulty

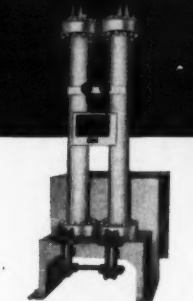
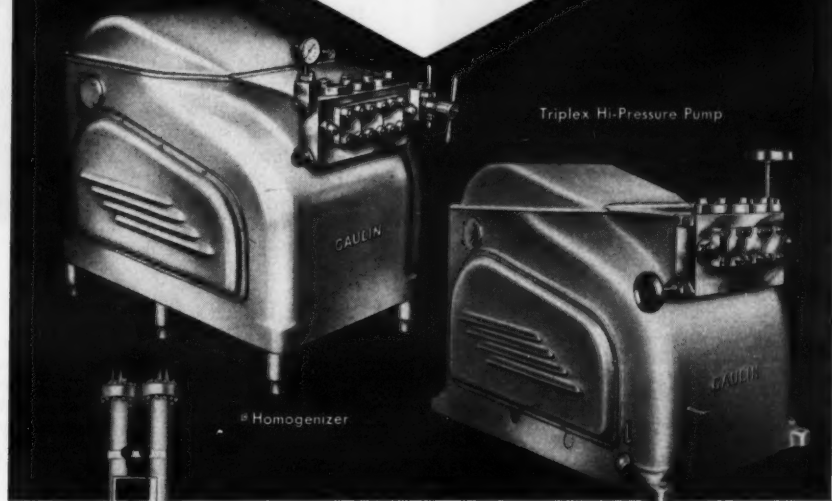
Units are available in ratings of 20 to 50 hp. A 20 hp model is said to be equivalent to a 50 hp conventional unit.

Typical operating results, on grain such as corn, are as follows: through 1/16" screen — 2300 lbs per hour using 20 hp unit. 5000 lb per hour with 50 hp model. Processing through  $\frac{1}{8}$ " screen — 4800 and 10,000 lb per hour respectively.

(Further information about the Noll mill may be obtained from Centrifugal Milling Equipment Corp., 9251 Park Ave., P.O. Box 287, Franklin Pk., Illinois.)

Check 3590 opposite last page.

# GAULIN G. T. A. (GAULIN TECHNICAL ASSISTANCE) Is the key to Savings IN MIXING OR MOVING PRODUCTS



HX-Hydraulic Pressure Exchange Pump



RE Colloid Mill



If you disperse, emulsify, blend particles . . . or pump, control, move liquids, Gaulin Technical Assistance *plus* Gaulin Equipment will bring you new product improvement and cost-saving solutions to your operations.

Gaulin Technical Assistance starts with the GTA library of product information. Ask for all or specific bulletins on each piece of equipment. Then, call for specialized GTA to bring you experienced advice and factual data on the best way to mix or move your product.

Fifty years' experience in analyzing fluid systems plus complete laboratory sampling and test facilities make Gaulin Technical Assistance the "extra" man in your product or process development program.



World's largest manufacturer of stainless steel reciprocating, rotary, pressure exchange pumps, dispersers, homogenizers and colloid mills.

## Ask GTA...

Gaulin Technical Assistance — for data on the complete Gaulin line: Homogenizers, Colloid Mills, Submicron Disperser, Triplex High Pressure Pumps and HX Pumps. Get GTA from your nearest Manton-Gaulin Representative . . .

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Check 3591 opposite last page.



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### ROCKWELL OVENS

**Bench, Cabinet, Truck  
and Conveyor Types**  
**ELECTRIC • GAS • STEAM**  
**Convection heating for fast,  
uniform heat processing**

Cabinet type gas oven  
with slotted door for re-  
moval of individual trays.

Get  
Bulletin 127

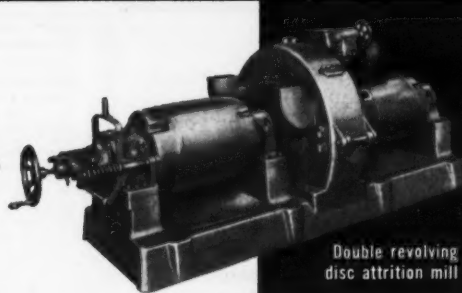
Electric oven with  
belt conveyor and feed hopper.

Truck type, indirect  
gas-heated oven.

**W. S. ROCKWELL COMPANY** 2200 ELIOT STREET  
FAIRFIELD, CONN.

Check 3592 opposite last page.

**Bauer**  
**MILLS**



Double revolving  
disc attrition mill

### For Granulating and Pulverizing

No matter what material or product you have to grind, granulate or pulverize, Bauer offers size reduction equipment that may do the job for you most profitably...and to the degree of fineness you require.

It might be plastics, chemicals, rubber, wood scraps, food products or even rare metal ore from the moon. Whatever it is, chances are we have field and research data on hand that will save you time and money. If we don't, our testing laboratories will get it for you.

The full line of Bauer mills is shown in Chemical Engineering Catalog and our Bulletin No. 59. Send for a copy today.

**THE BAUER BROS. CO.**  
1728 Sheridan Ave., Springfield, Ohio

Bauer processing  
equipment:

- Attrition mills
- Breakers
- Crushers
- Hammer mills
- Laboratory mills
- Granulators
- Texturizers
- Fiberizers
- Cleaners
- Classifiers
- Specific gravity separators

Check 3593 opposite last page.

## PROCESSING EQUIPMENT

**Thick, viscous solutions  
processed fast, efficiently  
by heavy-duty mixer**

Uses: Mixing thick, viscous solutions.

Features: Mixer's bridge swings in 240° arc, making it possible to mix one batch, while other batches are positioned along arc of swing, ready for immediate processing.

Description: Known as the Daysolver, mixer is built with a heavy-duty steel column, frame, and bridge. Oversize stainless steel impeller shaft helps provide smooth, vibration-free operation even under heavy work loads.

Shaft and impeller are raised and lowered by use of air-operated hoist. Device is cush-



Mixer's bridge swings in 240° arc, providing for a fast switching of batches

ioned at both ends of stroke by an oil hydraulic circuit.

Variety of impellers are available, including one which combines five different mixing actions. Two-speed or variable-speed drives may be provided. Mixers range in size from laboratory to large, 75 hp model.

(Daysolver is product of the J. H. Day Company, 4932 Beech St., Cincinnati 12, O.)

Check 3594 opposite last page.

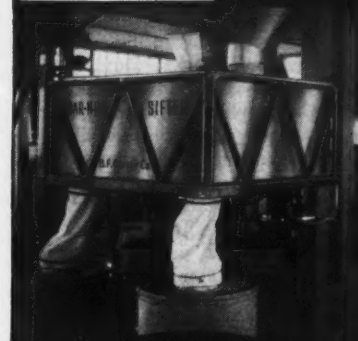
**Low space requirements,  
high efficiency features  
of dust collector**

Uses: Removing dust from air or gas streams.

Features: Compact design minimizes space requirements

do you  
screen or  
size dry  
chemicals?

laboratory  
pilot plant  
production



Get bonus performance

**BAR-NUN SIFTER**

Do you need to grade a material by particle size . . . screen out oversize and undersize particles . . . remove lumps or foreign materials . . . or make any type of particle-size separation? Then you want these Bar-Nun Rotary Sifter advantages:

- Accurate separations in large volume, produced in limited floor space.
- Screens totally enclosed by dust-tight, all-metal box. Optional stainless steel construction.
- Easy cleaning. Flip-action clamps permit quick opening of box, and easy removal of screens for thorough cleaning.
- Smooth, low cost operation. Exclusive, all-mechanical design and rugged construction give trouble-free performance even in continuous service on "hard-to-sift" materials.

For single or multiple separations, as fine as 325 mesh—in laboratory work or big volume, heavy duty production—you'll get bonus performance from a Bar-Nun Rotary Sifter. Users' repeat orders prove it. Write for specific details and recommendations without obligation.

**SEND FOR 6-PAGE BULLETIN 503**

For details on other Gump processing equipment, refer to your copy of Chemical Engineering Catalog.



FEEDING • MIXING • SIFTING • WEIGHING • PACKING  
EQUIPMENT FOR THE PROCESS INDUSTRIES

**B. F. GUMP Co.**

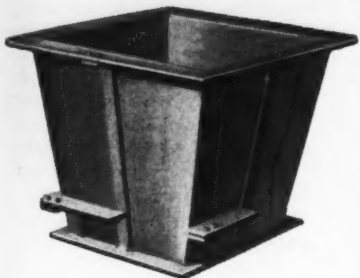
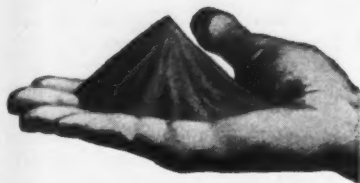
Engineers & Manufacturers Since 1872

1344 S. Cicero Avenue • Chicago 50, Illinois

Check 3595 opposite last page.

CHEMICAL PROCESSING

## For accurate reproduction of bulk material formulations—W-C BATCH-WEIGHING SYSTEMS



In any batching operation—from simple dump-and-fill weighing to multi-ingredient ratioing—W-C Batch-Weighing Systems provide the reliably accurate net-weight control essential to consistent product uniformity.

Chief reason for this is the W-C Pneumatic Weight Transmitter. A rugged yet sensitive force-balance unit, it is capable of an accuracy of  $\pm 0.25\%$  calibrated weight range, with reproducibility better than 1 part in 2000.

Each W-C Batch-Weighing System is designed to job specifications, using pre-engineered, unitized components of known performance capabilities. Consequently, you are spared the uncertainties—and costs—of "prototype" engineering... yet you realize the very tangible benefits of an application-engineered system built to your requirements.

**Typical applications include:**  
Formulating solid rocket fuels, refractories, varnishes, plastics, food products, dry or liquid.

Write for new Bulletin 14



**WEIGHING & CONTROL COMPONENTS, INC.**  
Div. of CompuDyne Corp.

E. County Line Road • Hatboro 10, Pa.

S.A. 8129

Check 3596 opposite last page.

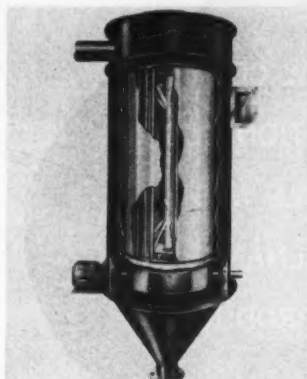
FEBRUARY 1960

## PROCESSING EQUIPMENT

while providing high air/cloth ratio.

**Description:** In operation, centrifugal action is imparted to incoming dust. This separates much of the particles before reaching filter fabric.

Design also incorporates rotating blow tube and roller support system that require no reversing mechanism or



Centrifugal action imparted to particles separates much of the dust before it reaches cloth filter fabric in collector

switches. System operates with low torque, provides uniform cleaning time.

Design assures that a controlled wrap of cloth is maintained around the blow tube at all times. Automatic cloth take-up is also provided. Particles are removed from fabric pores by reverse bending action of cloth.

Collectors are available in three sizes, 1000, 1500, 2000 cfm.

(Dustex Roto-Jet cloth dust collectors are manufactured by Dustex Corp., P. O. Box 2520, Buffalo 25, New York.)

Check 3597 opposite last page.

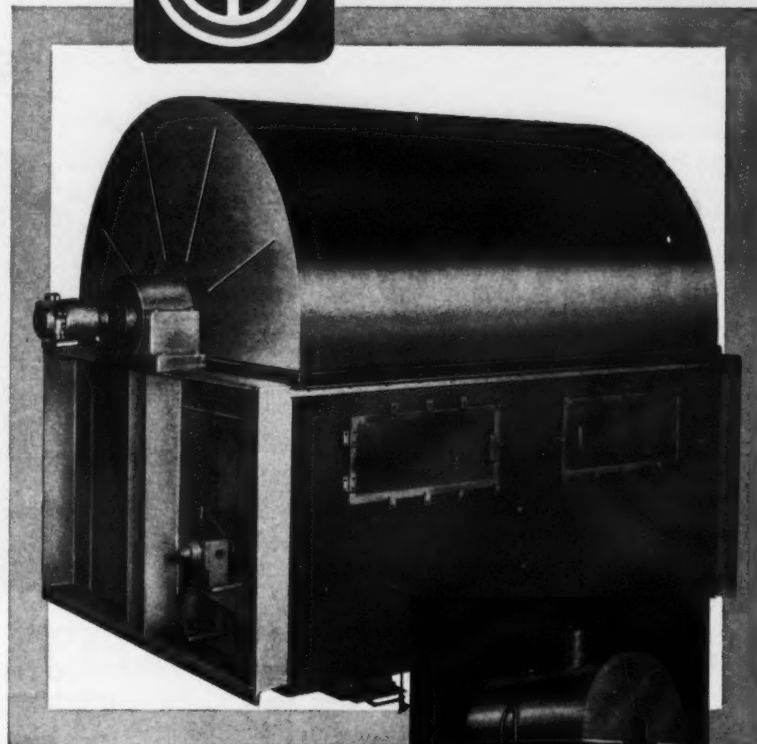


## PLUS FEATURES

OF



# FLAKERS



## ...ASSURES GREATER OPERATING EFFICIENCY

This 60" dia. x 72" flaker was designed and built for a major chemical company to convert molten organic chemicals to solid flakes. The unit features:

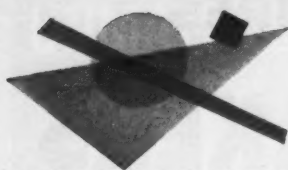
- Air operated knife holder
- Special monel construction double shell drum
- Enclosure confines obnoxious vapors
- Feed pan projects to rear for access to and inspection of overflow adjustment

More detailed information on this and other G-B designed and built equipment is yours for the asking.



**GOSLIN-BIRMINGHAM MANUFACTURING CO., INC.**  
BIRMINGHAM, ALABAMA  
FILTERS • EVAPORATORS  
PROCESS EQUIPMENT  
CONTRACT MANUFACTURING  
including HEAVY CASTINGS

Check 3598 opposite last page.



# MODERNIZING WITH NEW EQUIPMENT?

what will the **REAL** cost be?

# REAL COST =

CAPITAL COST  
+  
INSTALLATION COST  
+  
AVOIDABLE WASTE  
+  
MAINTENANCE  
+  
DELAYED PRODUCTION

The purchase price can be the least of




these over the years you will operate

the equipment. PROCTOR users agree

that the comparison of real costs often

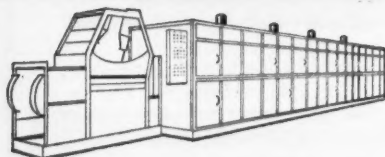
looks like this

## PROCTOR EQUIPMENT

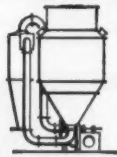
OVERALL COST	maintenance	
	cost of set-up time	
	capital purchase price	

## OTHER EQUIPMENT

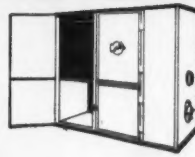
OVERALL COST	maintenance	
	cost of set-up time	
	capital purchase price	



CONVEYOR DRYERS



SPRAY DRYERS



TRAY DRYERS



TRUCK DRYERS

Write for bulletin #443.

Proctor & Schwartz will be happy to show you how buying Proctor equipment will cost you less.



See our insert in Chemical Engineering Catalog.

**PROCTOR & SCHWARTZ, INC.**  
PHILADELPHIA 20, PA.

Check 3599 opposite last page.

## PROCESSING EQUIPMENT

**All-hermetic centrifuge handles up to 5000 gph, operates at 125 psi**

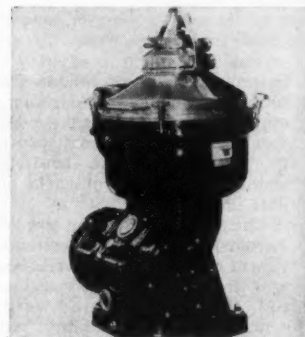
Bowl has 24" diameter, revolves at 4400 rpm

**Uses:** Separating and clarifying viscous or inflammable materials, or products which must be kept from contact with air.

**Features:** Centrifugal separator has 5000 gph capacity, withstands 125 psi.

**Description:** All-hermetic centrifuge is disc-type unit weighing approximately 2600 lb less motor. Bowl diameter is 24". Bowl speed is 4400 rpm.

Centrifuge requires 20 hp, can be operated with either direct motor drive or V-belt pulley for separate motor



Centrifuge is designed to process inflammable materials or products which must be kept from contact with air

drive. Except for frame, which is made of heavy-duty cast iron, all parts, including bowl, bowl discs, bowl cover, and outlets are of stainless steel.

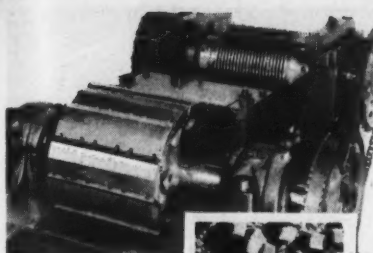
Inlet and outlet connections are equipped with long-life seals. Seals assure air-free operation up to 125 psi.

(SRG-214 centrifuge is product of The De Laval Separator Company, Industrial Division, Poughkeepsie, N. Y.)

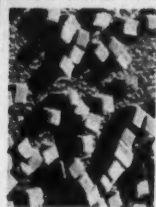
Check 3600 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.





## HOW TO CUT THE COST OF PELLETIZING:



POLYPROPYLENE

POLYETHYLENE

POLYSTYRENE

NYLON

VINYL

UREA

RUBBER—Natural and Synthetic

Use Taylor-Stiles precision multi knife cutters to cut your pelletizing costs of sheet stock and rods of the above materials.

Scores of leading plastics and rubber manufacturers find Taylor-Stiles method of shear cutting plastics and rubber gives them these benefits:

1. Production is increased
2. Power costs are lowered
3. Less maintenance is needed
4. Knife sharpening costs are considerably less
5. Pellets are uniform in size, and without fines or longs.

For complete details of the full line of Taylor-Stiles Pelletizers, with production rates of up to 20 times an hour, write today for our technical bulletins, 213, 216, and 217.

**TAYLOR, STILES & CO.**

20 Bridge Street, Riegelsville, N. J.

Check 3601 opposite last page.

### NEW LITERATURE

#### Processing Equipment

Disc-type filter for use in pulp and paper industry is reviewed in four-page bulletin. Photographs and flow sheets of typical plant installations are included. Bul 3306—Dorr-Oliver Incorporated.

Check 3602 opposite last page.

Centrifugal separators for purifying and dehydrating oils and fats are described in eight-page bulletin. Bul 2480 — Centrico Inc.

Check 3603 opposite last page.

Vertical pulverizer with built-in variable speed classifier is illustrated and described in four-page bulletin. Charts indicate capacities for two different models. Bul 51C-1 — Pulverizing Machinery Division, Metals Disintegrating Co., Inc.

Check 3604 opposite last page.

Filter element materials and assemblies are detailed in two-page bulletin. Photographs and photomagnifications are included. Materials discussed provide particle size control from  $\frac{1}{2}$  to 250 microns in temperature ranges from  $-350^{\circ}$  to  $1500^{\circ}\text{F}$ . "Filter Element Materials"—Bendix Filter Division, Bendix Aviation Corp.

Check 3605 opposite last page.

Filter bags capable of operating at above  $500^{\circ}\text{F}$  are discussed in four-page bulletin. Applications in carbon, cement, smelting, and other industries are reviewed. "The Modern Solution To Fume and Dust Filtration Problems"—Menardi & Company.

Check 3606 opposite last page.

Ultrasonic homogenizers are topic of six-page illustrated bulletin. Applications, including chemical reactions, dispersing, emulsifying, and aeration are described. Bul 259 — Sonic Engineering Corp.

Check 3607 opposite last page.

Dust collector improvements are reviewed in recently issued technical bulletin. Involute design, hopper discharge valves, and large diameter tubes are discussed. Bul 300 — Research-Cottrell, Inc.

Check 3608 opposite last page.

Size reduction machines for wet and dry materials are reviewed in four-page bulletin. Two designs are described — whirling-blade vertical-flow and oscillating-type granulators. Complete specifications are listed. Bul 350 — F. J. Stokes Corporation.

Check 3609 opposite last page.

FOR CONTINUOUS HEATING OR COOLING OF

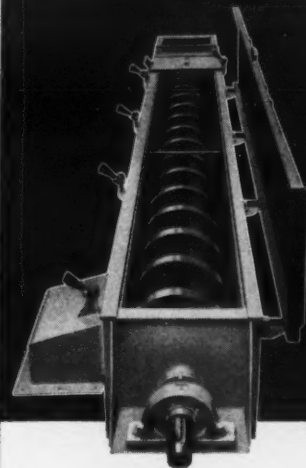
PASTES, POWDERS AND GRANULAR SOLIDS

RIETZ THERMASCREWS OFFER

UNIQUE AND IMPORTANT

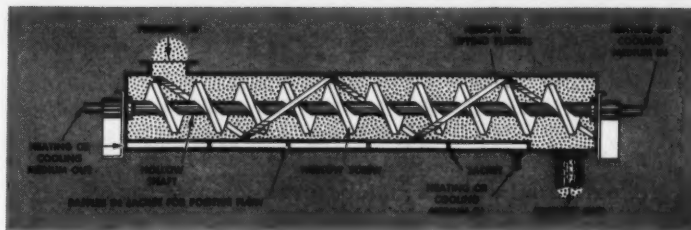
ADVANTAGES TO THE

CHEMICAL PROCESS INDUSTRIES



*Rietz*

## JACKETED TROUGH — HOLLOW SCREW — HOLLOW SHAFT THERMASCREWS



- Greater capacity in less space.
- Design allows rapid, thorough cleaning.
- High ratio of heat transfer surface to volume of product.
- Gentle handling of crystals and granules minimizes particle degradation.
- Dust and vapor tight construction available
  1. For solvent recovery.
  2. For use with inert gas or any controlled atmosphere.
- Controlled retention time
  1. To insure end product uniformity.
  2. To permit use as a chemical reactor.

RIETZ Bulletin No. T-506—available on request—contains additional information on Thermascrews.

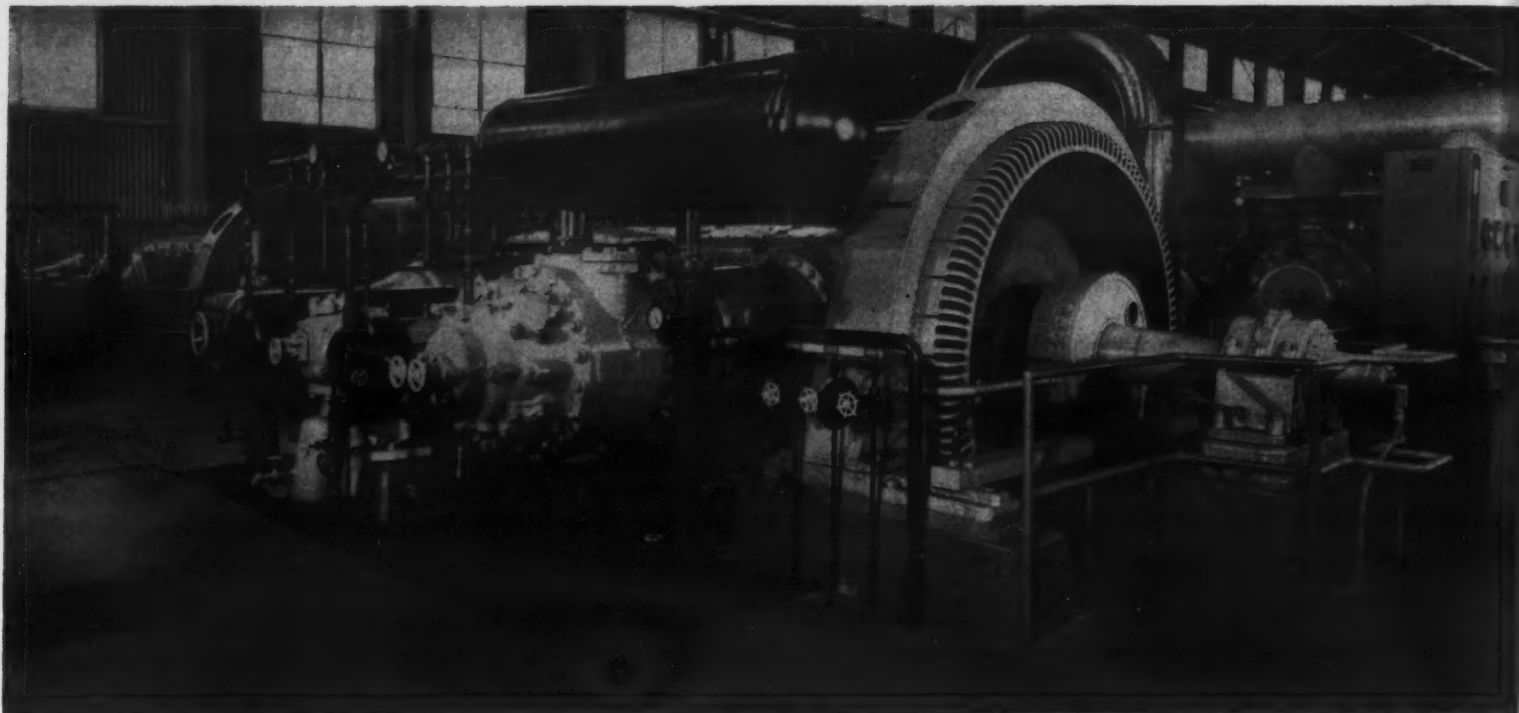
*Rietz*

Equipment for the Process Industries  
Size Reduction • Mixing • Heat Exchange

**MANUFACTURING COMPANY**

Santa Rosa, California • West Chester, Pennsylvania  
Sales and Engineering Offices in Principal Cities

Check 3610 opposite last page.



Typical installation of compressors similar to those in service in Texaco ammonia plant at Lockport



**PLANT ENGINEERING  
MAINTENANCE & SAFETY**  
... electrical & mechanical developments

## Excellent Service Supplied by Compressors In Ammonia Plant

**Minimum downtime and very little maintenance experienced with six motor-driven compressors considered to be unusual for this type of operation in which a variety of gases is being handled by the flexible units**

**GORDON WEYERMULLER**, Petrochemical Editor

**KEY** role is played by six horizontal, multi-stage, multi-cylinder, reciprocating compressors in the Texaco ammonia plant at Lockport, which uses the Casale process. Compressors, which were placed in service in late 1957, have provided continuous operation a large portion of the time.

At the first shutdown in August 1958, the compressors were inspected and found to be in satisfactory condition. Very little maintenance has

been needed on the units. This record is considered to be unusual for the complexity and rigorous demands of this type of service.

Of the six compressors, two are used for each of three operations. Hence, one of each set can be shut down and plant still run at 50% of capacity.

### **Air-N<sub>2</sub> Compressors**

First two compressors, each of which has eight cylinders,

handle air and nitrogen. They operate at 300 rpm. Three of cylinders compress air going to air-separation plant. Air comes in at atmospheric pressure, is compressed to 36.6 psia in first cylinder, 81.6 psia in second, and 191 psi abs in third.

Other five cylinders compress nitrogen from air separation plant in five stages. Suction pressure is 1 psig. Discharge from first stage is 47.8 psig; from second, 139.5 psig; from third, 421 psig; from fourth, 1043 psig; and from fifth, 2979 psig.

A portion of nitrogen from third stage goes to synthesis gas make-up for trim blending to get proper proportions of nitrogen and hydrogen to make ammonia. Nitrogen from fifth stage goes to cold box where hydrogen is purified.

The nitrogen supplies refrigeration and also serves as a wash liquid for final purification of hydrogen stream. Pressure of nitrogen drops to 350 psig in this process.

### **Mixed Gas Compressors**

Each of second set of compressors handles four gases with five cylinders. Units operate at 400 rpm.

First two cylinders compress ethylene for closed refrigeration system used in hydrogen purification. First cylinder compresses ethylene in two stages, operating in tandem. Suction pressure is 2 psig, first stage discharge is 48.2 psig, and second stage discharge is 140.8 psig. Second cylinder increases pressure of ethylene to 445 psig in third stage.

Third cylinder compresses ammonia, which serves as a refrigerant. This cylinder also handles two stages in tandem. First stage takes ammonia at 1 psig and compresses it to 63 psig. Some of this ammonia is used for cooling air and reformer gas before they enter low temperature units.

Remaining ammonia passes to second stage and is increased to 245 psig. It is used to cool ethylene.

Fourth cylinder handles fuel gas, the lightest material from hydrogen purification, in two stages. Suction pressure is 1 psig; first stage discharge, 43.6 psig; and second stage discharge, 115 psig.

Fifth cylinder compresses light hydrocarbons, such as propane and butane, which are the heavier materials from hydrogen purification. Suction pressure is 1 psig; first stage discharge, 42.9 psig; and second stage discharge, 115 psig.

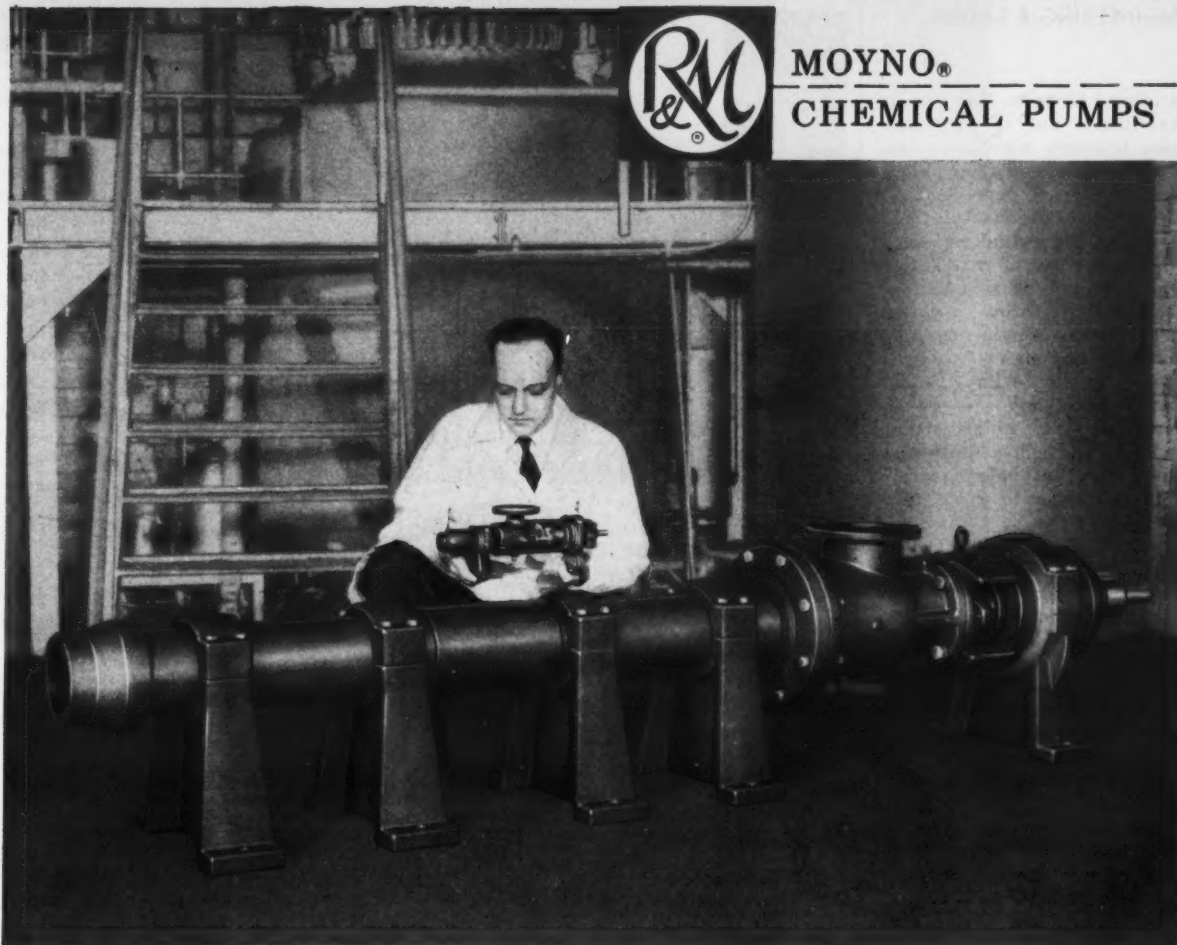
#### Synthesis Gas Compressors

Last two compressors handle synthesis gas in three stages. Each has three cylinders. Suction pressure is 335 psig. Design discharge pressure from first cylinder is 1068 psig; from second, 3070 psig; and from third, 9385 psig. Actual operating pressure is much lower, being 1050 psig for first stage, 2500 for second stage, and 6900 for third stage.

#### Design of Compressors

Balanced compressors have one-piece frame open at top for admitting crankshaft. Bearings are removable and interchangeable in service. Bearings, crankshaft, and connecting rods are all generously sized to make structure conservatively stressed. Covers allow easy access to interior for adjustment and inspection. Force-feed lubricators, operating independently of compressor drive, assure adequate lubrication during starting and stopping periods.

Both FM and JM motor-driven compressors have main bearings in both sides of every crankthrow. This insures not only low bearing pressures but also inherently low



**MOYNO<sup>®</sup>**  
**CHEMICAL PUMPS**

## MOYNO PUMPS capacities: from 1/100 to 500 gpm pressures: up to 1000 psi



MOYNO pumps are available in nine sizes with capacities ranging from minimum metering flow to 500 gpm and pressures from zero to 1000 psi. Positive displacement delivers uniform discharge without pulsation, agitation or turbulence. Solutions ranging from thin watery slurry to extremely viscous paste, corrosives, abrasives and even solids in suspension are economically handled without excessive pump wear.

MOYNO's unique "progressing cavity" principle with only one moving part and special resistant internal parts slashes pump maintenance costs on problem chemicals that often ruin other pumps. Almost any substance that can be forced through a pipe can be pumped by a MOYNO.

To learn how a MOYNO can cut your pumping costs, see our product information in *Chemical Engineering Catalog*, or write today for Bulletin 30 CP.



### ROBBINS & MYERS, INC.

motors, household fans, Propellair industrial fans, hoists, Moyno industrial pumps  
SPRINGFIELD, OHIO • BRANTFORD, ONTARIO

Check 3611 opposite last page.



bending stresses in each crankthrow due to the short span between main bearings. Since these low bending stresses are not dependent on the balance of thrusts from two opposing cylinders, complete flexibility of installation and operation is realized.

Thus, any throw may be fitted with a single-acting, a double-acting, or even a two-stage tandem cylinder, and in operation any one cylinder may be unloaded or changed to single-acting operation quite independently without danger to the crankshaft.

Provisions are made in the compressors for the use of crankshaft counterweights properly sized for smoothest performance. These counterweights, by counteracting the inertia forces of the moving masses at their points of origin, achieve balance of forces and force-couples without large internal strains of frame and crankshaft.

Plant also employs an ejector for recirculating unreacted gases. This cuts compression requirements and lessens possibility of contamination.

(M line compressors are the product of The Cooper-Bessemer Corporation, Mount Vernon, Ohio.)

Check 3612 opposite last page.

(Ammonia plant was designed and built by Foster-Wheeler Corporation, 666 Fifth Ave., New York 19, New York.)

Check 3613 opposite last page.



## ENGINEERED TEFLON\* PRODUCTS for Chemical Processing

# G A R L O C K

### BEST AT EXTREME TEMPERATURES WHERE CORROSIVES ARE PRESENT

**Garlock Teflon-jacketed Gaskets** give you the advantage of using Teflon without sacrificing resiliency and deformability . . . particularly important on your glass-lined process equipment, light metal flanges, and glass pipe flanges and fittings. Garlock offers four basic designs—slit envelope, milled envelope, formed shield, double jacket—and a wide selection of filler materials and thicknesses. Catalog AD-154.

**Garlock SOLID Teflon and Teflon-lined Expansion Joints**, exposed to the most reactive chemicals, guard costly piping against pressure surges from pumps, compressors and engines . . . reduce flange breakage, prevent stress, compensate for misalignment. Catalog AD-137.

**Garlock LATTICE-BRAID† Teflon Packings** are perfect on pumps and engines in petrochemical, oil and gas service. They are strong, long-lasting, chemically inert. Withstand temperatures ranging from -120°F to +500°F. Less gland pressure is required to effect an adequate seal, resulting in longer sleeve and packing life, less downtime. Catalog AD-131.

**Garlock CHEMISEAL† Mechanical Seals** possess greater immunity to corrosion and are more economical than any other design offered. Easy to handle and install, do not score shafts, engineered to give a life expectancy many times that of other seals. Available in standard sizes to fit all pump shafts 1/8" to 2 1/8" shaft. Seals against all media in pressures to 100 psi at 75°C or 75 psi at 100°C. Catalog AD-164.

For more complete information, call your Garlock representative at one of Garlock's 26 sales offices and warehouses throughout the U.S. and Canada. Or, write The Garlock Packing Company, Palmyra, New York.

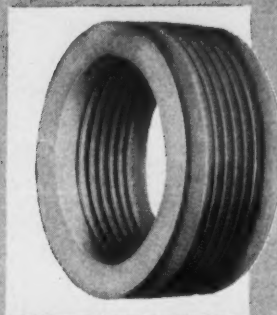
**Canadian Div.:** The Garlock Packing Company of Canada Ltd.

**Plastics Div.:** United States Gasket Company

**Order from the Garlock 2,000 . . .** two thousand different styles of Packings, Gaskets, Seals, Molded & Extruded Rubber, Plastic Products

†Registered Trademark

\*DuPont Trademark for TFE Fluorocarbon Resin



**Teflon Expansion Joints** protect expensive piping from damage due to stress, misalignment . . . resist solvents, acids, caustics to 125 psi.

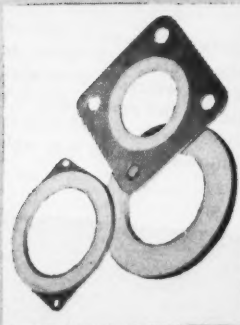


**CHEMISEAL Mechanical Seals** can be installed quickly and simply, offer leak-proof sealing without shaft wear . . . resist most reactive chemicals.



**LATTICE-BRAID Teflon Packing** lasts far beyond the limits of other packings . . . gives maximum service over wide range of temperatures, pressures. Only Garlock can give you LATTICE-BRAID.

**Teflon-jacketed Gaskets** offer the advantage of applying Teflon without the loss of resiliency . . . ideally suited to pipes, flanges in chemical processing.



For more information on product at left, specify 3614 see information request blank opposite last page.



## Chemical Boobytraps

Unsuspected hazards  
awaiting the unwary

### Nitric-acid fumes— sneak killers

Nitric acid is the most unstable of the commonly used mineral acids. It decomposes with heat, sunlight and most metals (except gold and platinum) to evolve oxides of nitrogen. Nitrogen pentoxide, which is the anhydride, decomposes and dissociates into oxygen and nitrogen dioxide.

What happens next is academic—both acids and higher oxides of nitrogen are highly toxic to breathe. When sawdust is thrown on nitric-acid spills, or when an iron or galvanized bucket is used to carry nitric acid, fumes (which may range in color from yellow through red and brown to nearly black) are evolved.

These fumes are not particularly unpleasant to smell. They must, however, be avoided since they seriously damage the alveoli of the lungs. Some time after exposure (frequently up to 18 hours), these delayed-action fumes may produce pulmonary edema, with fatal results in many cases.

Use of an approved breathing apparatus is mandatory if nitric fumes are encountered. When exposure does occur, injured should be immobilized as promptly as possible. Oxygen administration under close medical supervision follows. Recovery or death will normally occur within 48 hours.

It has been recently established that silo-filler's disease, which has killed numerous men who descended into silos for inspections or to remove feed for cattle, is caused by oxides of nitrogen. This, of course, is produced by fermentation of silage.

(Contributed by Howard H. Fawcett, Safety Director, Research Laboratory, General Electric Company, Schenectady, N.Y.)



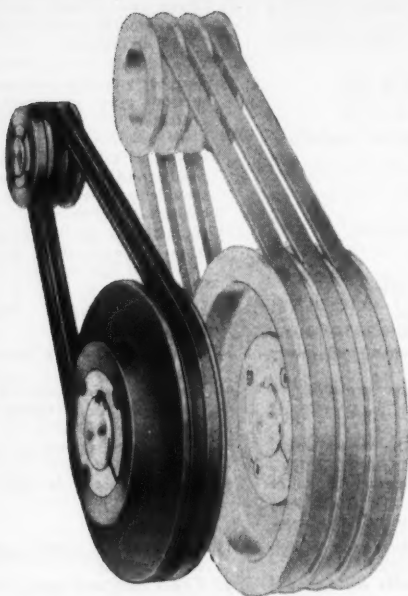
**HIGH CAPACITY  
LOW COST  
PROVED BY DYNA-V**

Here is a Dyna-V Drive on a paper mill line shaft. The 8-groove, 5-V Dyna-V driver sheave replaces the 10-groove D-section sheave shown in foreground. Dyna-V delivers the same power—in a far more compact drive—with a \$477 difference in price—and big future savings in belt replacement cost!



# Dyna-V

THE NEW MONEY-SAVING  
IDEA IN V-BELT DRIVES!



Dyna-V compared with big-groove drive for same hp. Dyna-V is capable of handling 3 times as much hp in the same space! Dyna-V Drives are available for capacities from 1 to 1500 hp.



**CALL THE TRANSMISSIONER** — your local Dodge Distributor. Factory trained by Dodge, he can give you valuable help on new, cost-saving methods. Look under "Dodge Transmissioner" in the white pages of your telephone directory, or in the yellow pages under "Power Transmission Machinery".

The day of big-groove sheaves and belts is passing. The new idea of compact V-belt drives—Dyna-V—introduced by Dodge just a few short months ago, is taking the country by storm. Thousands of Dyna-V Drives are at work in industry everywhere, carrying their loads easily, dependably, and proving their ability to *deliver more horsepower per dollar!*

Dyna-V utilizes the full performance possibilities of today's great synthetic fibers for belts—and modern metals for sheaves. Narrow belt top widths team up with narrow sheave grooves to create Dyna-V compactness. Narrow grooves reduce face width—save weight. Costs are lowered. Smaller diameter sheaves and shorter center distances multiply savings. With Dyna-V you cut costs on most initial installations and economize on belt replacements as well. In medium and high hp ranges these savings can be as much as 30%.

Dyna-V Sheaves decrease shaft overhang—increase bearing life. And Dyna-V Belts possess all premium qualities. Conditions requiring oil, heat, moisture resistance or static conductivity are met by Dyna-V's one grade—the finest. Ask your local Dodge Distributor. Or write us for Dyna-V Bulletin.



DODGE MANUFACTURING CORPORATION, 6200 UNION STREET, MISHAWAKA, INDIANA

Check 3615 opposite last page.

## Smaller speed reducers give higher hp

**Uses:** Speed-reducer applications.

**Features:** Speed reducers incorporate fan cooling, centrifugally cast bronze gears and heat-treating techniques on alloy-steel worms, which permit higher input horsepower and output-torque ratings with smaller units.

**Description:** Each fan-cooled worm gear reducer has one-piece housing of cast iron. Housing is ribbed. Cooling fan is mounted on input end of worm shaft and is equally efficient in either direction of rotation.

Worms are cut integral with shaft. They are ground to high surface finish on both thread flanks. Gears have centrifugally cast bronze rims with high tin-nickel content. They are made integral with cast-iron center. Size range is 1 to 40 hp.

(Fan-cooled speed reducers are product of The Cleveland Worm & Gear Company, Subsidiary of Eaton Manufacturing Company, 3300 E. 80th St., Cleveland 4, Ohio.)

Check 3616 opposite last page.

## Ball valves hold up at -300 to +400°F

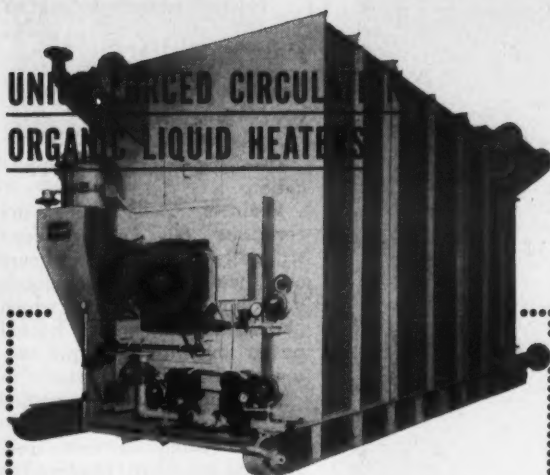
**Uses:** Handling light slurries and throttling for close regulation of flow.

**Features:** Valves can operate in temperature range of -300 to +400°F. They have been tested to 1000 psi in sizes of 1/4 to 3/4" and to 600 psi in sizes of 1 to 2" (in stainless steel).

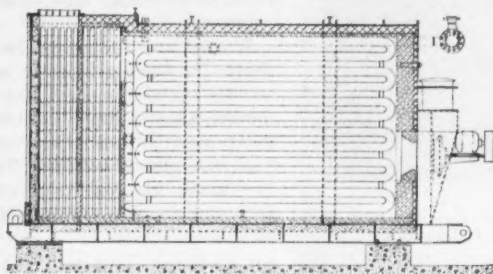
**Description:** Ball valves can be on flow in either direction. Adjustable stuffing box is repairable under pressure. Seats act as seals. Interchangeable union ends are adaptable to screwed, socket-weld, butt-weld, flanged and Victaulic connections. They are available in stainless steel and carbon steel.

(Alloy ball valves are product of Cooper Alloy Corporation, Hillside, N.J.)

Check 3617 opposite last page.



**10,000,000 BTU/hr. FORCED CIRCULATION LIQUID HEATER.** Fully automatic. Gas and oil fired. Packaged unit with Union combustion control and flame safeguarding system for precise temperature control.



## SHOP ASSEMBLED UNITS INSTALLED WITHOUT COSTLY FIELD BALANCING

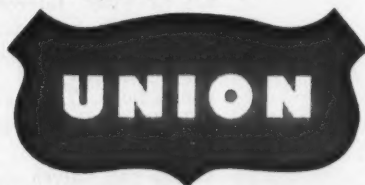
Right from the start, you can save with a Union shop assembled Forced Circulation Heater. With all of its circuits of the same hydraulic length, time consuming field balancing can be eliminated. Most units do not require orifices or any other mechanical adjustments to equalize flow at the time of installation.

High liquid velocities (8 to 10 ft./sec.) and liberally proportioned, water cooled furnaces eliminate localized overheating. As there are no multi-tube circuits in the radiant section, recirculation within a circuit is impossible, thereby eliminating vapor binding or stagnant flow areas.

Liquid and gas flow run counter to each other. With the liquid inlet positioned at the top of the convection section, the lowest temperature liquid is served by the lowest temperature gas. As a result, heater efficiency is improved and the risk of thermal shock minimized.

Standard units (both shop assembled and field erected) can be modified to meet a wide range of job requirements. They can be arranged for firing with most commercial fuels as well as waste fuels in liquid or gaseous form.

For specific information, outline your requirements to a Union representative or contact Union Iron Works.



UNION IRON WORKS • ERIE, PENNSYLVANIA

Check 3618 opposite last page.

## PLANT ENGINEERING MAINTENANCE & SAFETY

# Metering pump trouble

Problem	Probable Causes	Solutions
A) Pump will not start:	<ol style="list-style-type: none"> <li>1) Blown fuse.</li> <li>2) Open thermal overload device in starter.</li> <li>3) Low liquid level alarm is actuated.</li> <li>4) Low voltage.</li> <li>5) Discharge line blocked.</li> <li>6) Liquid in liquid end or lubricant "frozen."</li> </ol>	<ol style="list-style-type: none"> <li>1) Check for short circuit or overload.</li> <li>2) Reset.</li> <li>3) Fill tank and/or check low level alarm ground wire.</li> <li>4) Check for too light wiring.</li> <li>5) Check discharge points, stop valves, check valves, etc.</li> <li>6) Thaw with steam hose.</li> </ol>
B) Pump does not deliver rated capacity:	<p>Note: See also D-1, D-4 and D-6, below.</p> <ol style="list-style-type: none"> <li>1) Starved suction.</li> <li>2) Leaky suction pipe.</li> <li>3) Excessive suction lift.</li> <li>4) Liquid too close to boiling point.</li> <li>5) Capacity adjustment incorrectly set.</li> <li>6) Leaky packing.</li> <li>7) Incorrect pump speed.</li> <li>8) Worn or dirty valves and/or seats.</li> <li>9) Liquid viscosity too high.</li> <li>10) Insoluble materials or crystallization.</li> <li>11) Low discharge pressure.</li> </ol>	<ol style="list-style-type: none"> <li>1) Clean pipe, strainer or suction valve; use large suction pipe; or increase suction head.</li> <li>2) Repair or replace defective pipe.</li> <li>3) Rearrange equipment location to reduce suction lift.</li> <li>4) Lower temperature or increase suction pressure.</li> <li>5) Adjust properly. (If pump is plunger type, do not set stroke below 10% of full stroke.)</li> <li>6) Adjust or replace packing.</li> <li>7) Check line voltage and frequency against motor specifications.</li> <li>8) Clean or replace.</li> <li>9) Reduce viscosity, increase size of suction pipe or increase suction pressure.</li> <li>10) Limit solution strength to 5% by weight. Flush and clean solution tank periodically. Suction connection should be 2 to 4" from bottom of solution tank.</li> <li>11) A minimum discharge pressure of 5 psi is required to insure proper seating of ball checks.</li> </ol>
C) Pump delivers erratically:	<p>Note: See also C-6, below.</p> <ol style="list-style-type: none"> <li>1) Leaky suction line.</li> <li>2) Worn and/or dirty valve seats.</li> <li>3) Excessive excursion of ball valves from seats.</li> <li>4) Insufficient suction pressure.</li> <li>5) Liquid too close to boiling point.</li> <li>6) Leaky or improperly set relief valve.</li> </ol>	<ol style="list-style-type: none"> <li>1) Repair or replace.</li> <li>2) Clean or replace.</li> <li>3) Limit excursion to manufacturer's tolerance.</li> <li>4) Increase suction pressure by raising tank level or pressurizing suction tank.</li> <li>5) Reduce temperature or raise suction pressure.</li> <li>6) Repair, replace or reset valve.</li> </ol>
D) Motor overheats:	<p>Note: See also B-10 and B-11, above.</p> <ol style="list-style-type: none"> <li>1) Power supply does not match motor characteristics.</li> <li>2) Insufficient quantity or improper type lubricant in gear case.</li> <li>3) Pump operating beyond rated capacity.</li> <li>4) Packing too tight or improperly lubricated.</li> <li>5) Pump operating mechanism improperly lubricated.</li> <li>6) Mechanical misalignment.</li> <li>7) Frequent start-stop operation from timer.</li> </ol>	<ol style="list-style-type: none"> <li>1) Check power supply against motor specifications.</li> <li>2) Check level and type.</li> <li>3) Check operating conditions against manufacturer's specifications.</li> <li>4) Readjust packing and lubricate.</li> <li>5) Check all lubricating points and lubricant types.</li> <li>6) Check alignment.</li> <li>7) Motor for this service should always be three phase.</li> </ol>
E) Noisy operation:	<ol style="list-style-type: none"> <li>1) Pump valves.</li> <li>2) Loose rod bushing.</li> <li>3) Gear reducers.</li> </ol>	<ol style="list-style-type: none"> <li>1) When valves open and close they will make a clicking noise. This is usually indication of normal valve functioning.</li> <li>2) These cannot be tightened. Replace worn bushings (and pins if necessary).</li> <li>3) If there is excessive backlash in gears, adjust or replace.</li> </ol>

# le shooting

**RICHARD H. HAYMAN**  
Betz Laboratories, Inc.

**W**ATER treatment applications in many plants are such that the absence of proper chemical balances, even for short periods of time, can have dire results. Accordingly, proper maintenance is important.

A small stock of the usual repair parts should be kept on hand at all times. The manufacturer's operating manual should be carefully studied. Operating practices and maintenance schedules can be established accordingly. However, an operating manual may not always outline many things that can happen to interfere with pump operation. A check list of difficulties normally encountered is outlined in the table on the facing page.

(A more complete discussion of the various aspects of metering pump maintenance is contained in the paper, "Chemical Pump Trouble Shooting," by Richard H. Hayman which may be obtained from Betz Laboratories, Inc., Gillingham and Worth Streets, Philadelphia 24, Pa.)

Check 3619 opposite last page.

## Man can halt conveyor using trolley hanger

**Uses:** Conveyor control to provide personnel safety, under-lubrication protection, prevention of conveyor or drive damage due to "hang-up", warning of broken or jammed trolleys and protection of drive motors.

**Features:** Control is responsive to degree that one man can stop conveyor by pulling on trolley hanger, if such sensitive adjustment is desired.

**Description:** A meter of conveyor over-load safety con-



## PENNTROWEL® SURFACING

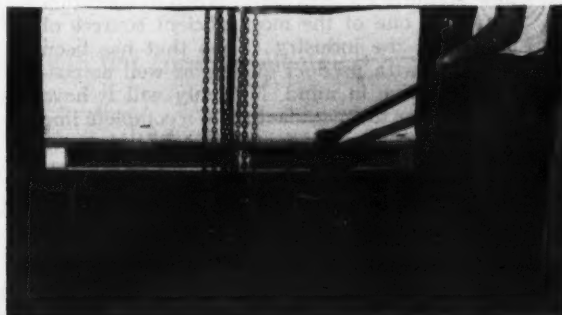
### *stops paper mill floor corrosion*

Corrosion once chewed this concrete floor to pieces in just two years. Located in a leading papermaking plant, the floor is steadily attacked by acid solution from the fourdrinier, and by both acid and alkali cleaners used on the machine. A costly replacement job seemed unavoidable. Instead, damaged concrete was cleaned and a  $\frac{3}{8}$ -inch Penntrowel surface trowelled on. A trowelled finish gives a non-skid surface. After many months of severe duty, the Penntrowel sheathing is successfully retarding corrosion and erosion, shows no sign of letting up for years to come!

Let Penntrowel show you how to *repair* corroded surfaces economically, and get long-lasting protection that saves maintenance dollars. Thoroughly tested in Pennsalt's own acid and alkali plants, Penntrowel floor surfacings have proved their effectiveness against acids, alkalis and solvents in many

types of plants throughout the nation. And they are applied without expensive equipment—you just trowel them on.

**Extra-tough Penntrowel floor surfacing** protects floor under the layboy of this rotary cutter in the same paper mill. Floor takes a constant beating from heavy iron-runner pallets dragged over it. Mill maintenance men estimate Penntrowel Carbon's extra hardness gives it five times longer life than previous materials.



**Pennsalt Chemicals**

ESTABLISHED 1850

*Write today for full information*

Corrosion Engineering Products Dept. 305

**PENNSALT CHEMICALS CORPORATION**  
Natrona, Pa.

Manufactured in Canada by G. F. Sterne & Sons, Ltd.,  
Brantford, Ontario

Check 3620 opposite last page.



# B&W

## has taken the step...



a **NEW PLANT** at Beaver Falls  
for the manufacture of a

## COMPLETE LINE OF WELDING FITTINGS AND FLANGES

Beaver Falls, Pennsylvania is the site for B&W's new Welding Fittings plant. When in operation it will be one of the most efficient sources of supply in the industry... one that has been designed with product quality as well as customer service in mind. Not only will it have facilities for the manufacture of a complete line of carbon, alloy and stainless steel fittings and flanges, but its location makes possible integration with B&W's other manufacturing operations... their steel mills and their tube mills.

This means that

(a) you can get a complete line of welding fittings and flanges

(b) you can get a complete process piping package — welding fittings, flanges and tubular products from one source

(c) you can more effectively control both buying and delivery from one manufacturer...  
The Babcock & Wilcox Company

An announcement of the transfer of welding fittings operations from Milwaukee to Beaver Falls will be made in the near future.

For further details ask for bulletin FDM-2016 or call on any of the local B&W District Sales Offices. The Babcock & Wilcox Company, Tubular Products Division, Beaver Falls, Pa.



TA-9026-G1

# B&W

THE BABCOCK & WILCOX COMPANY  
**TUBULAR PRODUCTS DIVISION**

Seamless and welded tubular products, solid extrusions, seamless welding fittings and forged steel flanges—in carbon, alloy and stainless steels and special metals

Check 3621 opposite last page.

## ENGINEERING & SAFETY

Control visually measures line pull by monitoring drive-motor current. Safety-shut-off point on ammeter is determined by operating properly lubricated conveyor under load. Control is self-compensating for motor starting surges.

Control is to be sold by manufacturer as component of its two conveyor systems. It can be used on any type conveyor with electric-motor drive. It is offered as OEM item to other manufacturers, as well as for installation on existing conveyors.

(Tipp-Tronic control is product of Conveyor Division, The American MonoRail Co., Fourth & Franklin Streets, Tipp City, Ohio.)

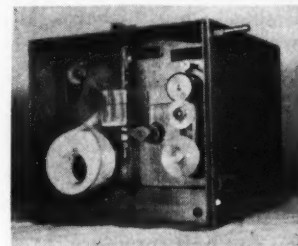
Check 3622 opposite last page.

## Dust and gas monitored by paper tape

Uses: Field recording of dust and/or gas concentrations.

Features: Sampler automatically collects up to 900 dust or gas samples by sucking air through paper tape. Volume of air per sample is adjustable in range of 1.5 to 36 cu ft.

Description: Portable paper-tape air sampler weighs 21



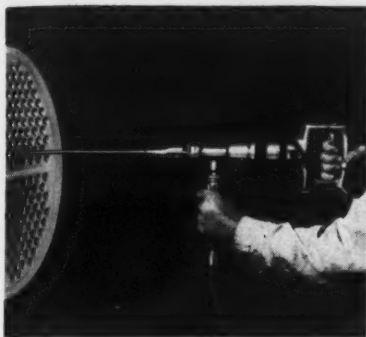
Portable paper-tape air sampler automatically collects up to 900 dust or gas samples by sucking air through paper tape

lb with its steel case. Sampler incorporates volumetric piston vacuum pump with graphite rings which require no lubrication.

Unit has application in nuclear and industrial-hygiene fields. In process control it can sample directly from stream (example: hydrogen sulfide content of illuminating gas).

For dust measurements,

# AIRETOOL CLEANER



**cleans condenser,  
H. E. tubes fast**

This new, advanced design Airetool Model CC-475 Cleaner does a fast, thorough job of cleaning heat exchanger and condenser tubes. Built-in flushing system washes out debris, stops jamming. The result is faster, more complete cleaning. And the flushing agent keeps the cleaning head cool, which extends head life.

You get all these advantages, yet this sturdy, pneumatic tool weighs only 10 pounds. One man operates it easily without need for supporting rig. For full details, or plant demonstration, write today.

## USES ALL TYPES OF HEADS



Every type of cleaning head can be used with Airetool Model CC-475. And Airetool makes them all.



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in principal cities of U.S.A., Canada, Mexico, South America, England, Europe, Puerto Rico, Italy, Japan, Hawaii.

**EUROPEAN PLANT:** Vlaardingen, The Netherlands  
**CANADIAN PLANT:** Brantford, Ontario

Check 3623 opposite last page.

FEBRUARY 1960

## ENGINEERING & SAFETY

darkening of 1/2" diam sampling spot is measured with densitometer. If radioactive dusts are involved, tape can be passed under Geiger counter. For gas measurements, specially treated papers are available. These change color in presence of many gases, such as hydrogen sulfide, carbon monoxide, hydrogen cyanide and phosgene.

(Portable paper-tape air sampler is product of Gelman Instrument Co., Box 86, Chelsea, Michigan.)

Check 3624 opposite last page.

**Al refractory material  
uses water additive;  
cures in 12 hr**

**Uses:** As lining material in catalyst collector cyclones, pick-up points, elbows, valve bodies and transfer lines.

**Features:** Normally troweled in place, refractory material can be mixed stiff enough to pound or ram. It requires only water additive, sets up in 2 to 4 hours and cures in 12 hours.

**Description:** Tabular aluminum refractory material is uniformly abrasion resistant at all temperatures to 2000°F. It is resistant to variety of acid and basic conditions. Material has fusion point above Cone 38 (3335°F). Mix weighs 150 lb/cu ft in place. It is available dry in 100-lb bags.

(Pli-Tab Trowl Mix is product of Refractory Division, Plibrico Company, 1800 N. Kingsbury St., Chicago 14, Illinois.)

Check 3625 opposite last page.

## NEXT MONTH

Differences between full-scale paper finishing and operations simulated in the laboratory, to test coating and sizing materials prior to mill use, have been reduced to a matter of inches at National Starch and Chemical. The background on this development appears in these pages next month.

# Chemically Inert Dry Bearing Material

**Chemloy 719\***



**use without lubricant!**

Chemloy 719 is proving to be the most *universal* dry bearing material ever offered to industry:

... because its extremely low coefficient of friction invites use where lubrication is impossible, impractical or undesirable.

... because it may be used on both sliding and rotating applications over a wide temperature range.

... because it is impervious to practically all known chemicals, solvents or corrosives.

... because it is excellent under vibration or shock service conditions.

... because it will not conduct electricity or cause galvanic corrosion.

Chemloy 719 is available in all basic forms—such as sheet, rod or tubing—or in parts molded or machined to specifications. Get full details.

\*The best in Teflon based bearing materials.

Request Bulletin T-120 and Price Sheet No. 126, or send b/p specs. for quotation on molded or machined parts. Crane Packing Company, 6421 Oakton St., Morton Grove, Ill. (Chicago Suburb). In Canada: Crane Packing Co., Ltd., Hamilton, Ontario.



Teflon is a DuPont Trademark



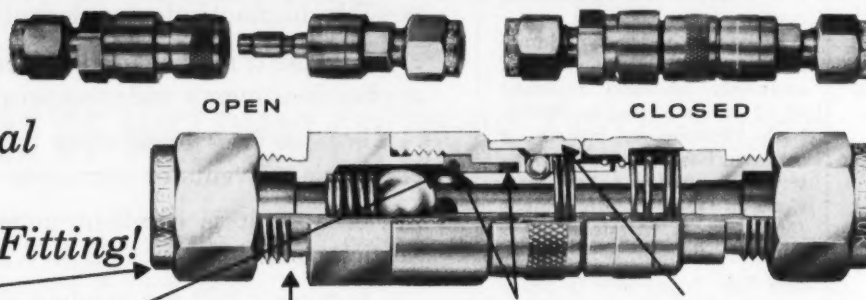
Check 3626 opposite last page.

## What's the secret of this fast, positive-seal fitting?



Swagelok Quick-Connect Fitting Installation in Boeing Airplane Company, Seattle, Wash., Test Facilities for Boeing 707 Jet Stratoliner.

*Here's the secret of this fast, positive-seal Swagelok Quick-Connect Fitting!*



1. Swagelok Quick-Connects with single end or double end shut off for tube to pipe, tube to tube, bulkhead tube to tube applications are available in brass and stainless steel in sizes for  $\frac{1}{4}$ " and  $\frac{3}{8}$ " O. D. tubing.
2. Flow resumed instantly and vacuum tight seal assured when connection is made.
3. Light, compact, streamlined design. Occupies little space. For use with portable equipment, and bulkhead or panel applications.
4. Instant-acting seals completely prevent loss of pressure when fitting is disconnected.
5. No twisting, turning or wrench action necessary. Easy straight-line finger tip pull or push action for instant connecting or disconnecting.

In the Boeing Airplane Company photo shown above, the tubes are instrumentation pressure lines running from the large jet engines on test stands to the patch board, where the lines are coupled into measuring devices.

The Boeing Airplane Company adopted this positive

Swagelok Quick-Connect Fitting to simplify test installations, and substantially cut down test set-up time. Both ends of the many pressure lines are Swagelok-equipped. Previously, engineers used a screw-type fitting which required a wrench and valuable time-consuming operations to tighten and remove.

Swagelok engineers are equipped with experience, ability, and a wide range of tube fittings designed to meet your individual problems. Quick delivery of Swagelok tube fittings from local distributor stocks.

**Swagelok®**  
TUBE FITTINGS

**CRAWFORD FITTING COMPANY**  
884 East 140th Street, Cleveland 10, Ohio

Crawford Fittings (Canada) Ltd., Niagara Falls, Ontario, Canada

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to fill in the slip with the other pertinent information: your name, title, company, product made, and address.

For more information on product at left, specify 3627 see information request blank opposite last page.





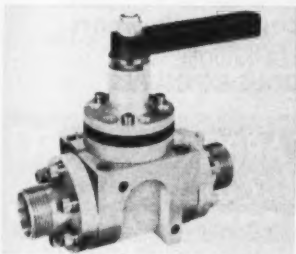
**Cryogenic media handled by manual 1" valve**

**Uses:** Manual control applications with cryogenic media.

**Features:** Valve can handle cryogenic media at temperatures to  $-350^{\circ}\text{F}$  and pressures to 3000 psi.

**Description:** Manually operated 1" valve reportedly requires no lubrication during entire life. Removable and interchangeable flanges are part of the valve's design.

Short bonnet assembly is thermally isolated from valve



Cryogenic media at temperatures to  $-350^{\circ}\text{F}$  and pressures to 3000 psi can be handled by valve

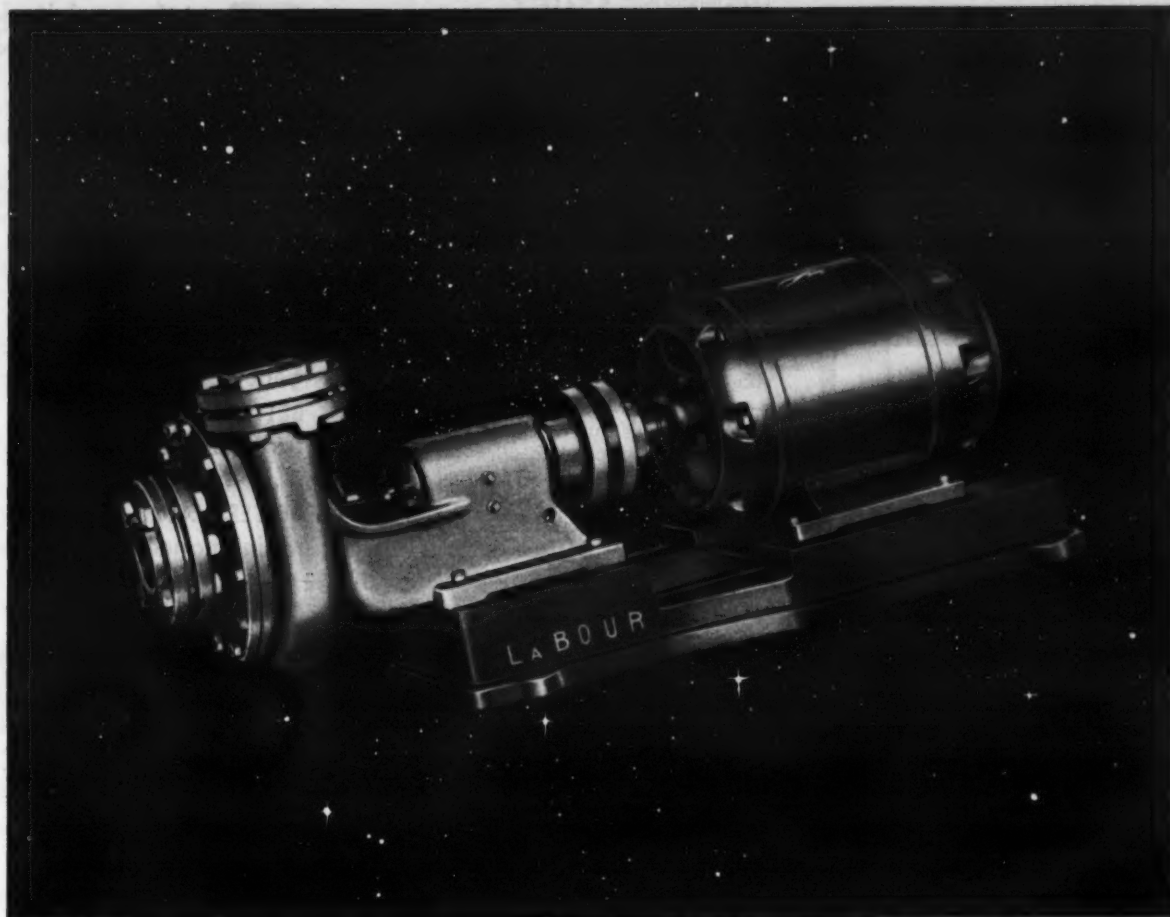
body. A torque of 25 in-lb is required to open or close valve at 3000 psi and  $-350^{\circ}\text{F}$ . Total weight is 2 lb. Valve may be line, panel or side mounted.

(Flow-Ball valve 115F is product of Hydromatics, Inc., Livingston, N.J.)

Check 3628 opposite last page.



"Now as I was saying last month before being interrupted—care should be taken at this point. . ."



## The Pump that can **TAKE THE AIR!**

In most applications where self-priming pumps aren't needed there are occasional circumstances that bring air or gas to the pump along with the liquid. If you've specified a LaBour Type Q or SQ, when this happens the pump clears itself without stalling and goes on pumping.

The ability of these LaBour pumps to handle considerable volumes of air or gas mixed with the liquid is a function of the

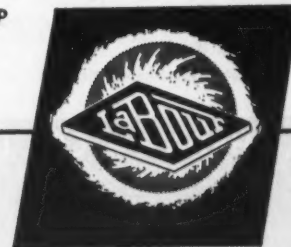
open impellers in conjunction with proper casing design. Since the open impellers work without dependence upon close clearances, these pumps show little loss of efficiency after long wear and severe service has increased original clearances manyfold.

Get the facts about pump efficiency and other advantages of open impeller design as created by LaBour. We'll be glad to supply those facts.

ORIGINAL MANUFACTURERS OF THE SELF PRIMING CENTRIFUGAL PUMP

# LABOUR

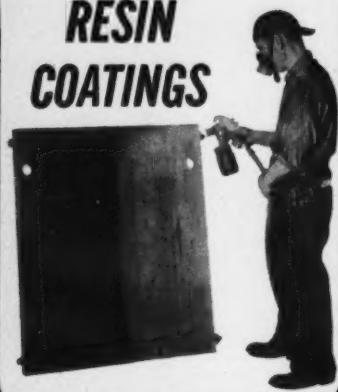
THE LaBOUR COMPANY, INC. • ELKHART, INDIANA, U. S. A.



Check 3629 opposite last page.

## INCREASE the LIFE of Wood Filter Plates & Frames

### SHRIVER RESIN COATINGS



Wood plates and frames coated with epoxy or urethane resin have shown amazing resistance not only to most corrosive chemicals, but also to heat.

Resultant increased service life more than pays for the moderate additional cost.

#### DISTINCT ADVANTAGES

- 1—Coating forms a hard, dense, adhesive, glossy surface, highly resistant to acids, alkalis and salts.
- 2—Reduces swelling, checking and distortion, so common with unprotected wood.
- 3—Improves durability in storage.
- 4—Offers excellent filter cake release.
- 5—Two coats, sprayed on, assure uniform penetration and covering of ALL surfaces.
- 6—Multiplies service life of plates and frames.

Let us prove these claims.

#### T. SHRIVER & CO., Inc.

846 Hamilton St., Harrison, N. J.

Sales representatives in  
Atlanta, Buffalo, Chicago, Detroit,  
Houston, Los Angeles, St. Louis, San Francisco,  
Montreal, Toronto, Mexico City

Check 3630 opposite last page.

## ENGINEERING & SAFETY

### One-man fire fighting anywhere in plant or on grounds

Uses: Pumping water for fire fighting.

Features: Portable pump has aluminum body construction and weighs 50 lb.

Description: Portable positive-displacement pump is both self-priming and operable in any position without loss in prime. No check valves are required. Pump handles water with suspended abrasives at suction lift of 28', while delivering 50 gpm at 100-psi discharge pressure.



Portable fire pump weighs 50 lb. It can be carried easily by one man over rough terrain

Fire pump is equipped with two-cycle gasoline engine mounted on aluminum skid. Entire unit can be carried by one man over rough terrain. This permits fire fighting in areas inaccessible to vehicles.

(Portable fire pump 2F7 is product of Goodyear Pumps Inc., 9 Rockefeller Plaza, New York 20, N. Y.)

Check 3631 opposite last page.

### Gas-expandable turbine in fully reversible

Uses: Gas pipeline valve operations.

Features: Turbine is fully reversible.

Description: Gas-expanding turbine incorporates forged one-piece two-row blade. This permits reverse rotation when gas or steam is directed against



Life and limb are at stake . . .

## CHOOSE THIS BETTER Emergency Light

### CARPENTER WATCHMASTERS

- ★ BETTER PROTECTION . . . every component of every unit is specially engineered for emergency lighting . . . for reliability
- ★ BETTER PERFORMANCE . . . each part must rate far in excess of even maximum requirements . . . for dependability
- ★ BETTER VALUE . . . built for longer life and less maintenance . . . for lowest cost over the years

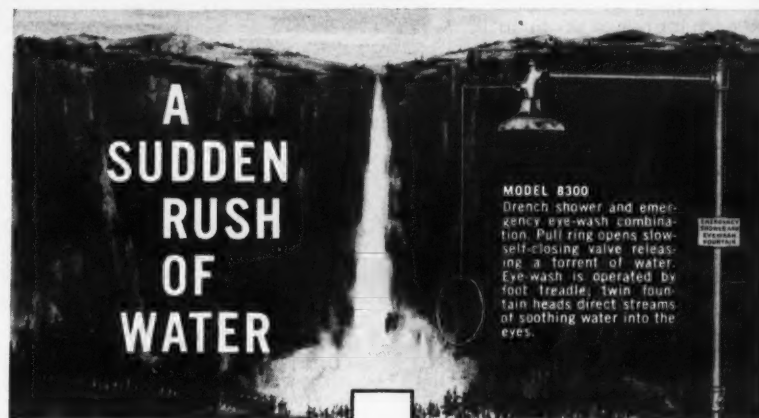
THERE IS A CARPENTER WATCHMASTER MODEL FOR EVERY NEED (INCLUDING HAZARDOUS EXPOSURES) AND FOR EVERY BUDGET

CATALOG  
and  
TECHNICAL SPECS  
available for the asking.  
Write for special  
Watchmaster material now.

### CARPENTER MFG. COMPANY

652 Bradley St.  
Somerville 45, Mass.

Check 3632 opposite last page.



## for immediate FIRST AID

### ... in accidental body contamination

Injurious chemicals are instantly washed away by the cascading water from Haws Drench Showers. Simple pull-chain or foot treadle valves release a sudden rush of water—saving valuable seconds until medical help arrives. Chances of permanent injury are minimized, and insurance claims correspondingly lessened. HAWS Emergency Drench Showers are available in models to meet virtually any industrial need. WRITE TODAY—to find out the full story!

**HAWS**

### DRENCH SHOWERS

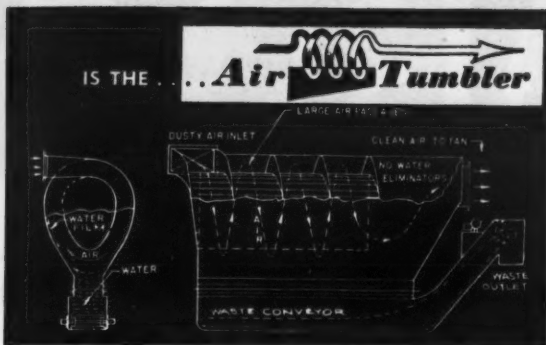
A product of  
**HAWS DRINKING FAUCET COMPANY**  
1443 Fourth Street • Berkeley 10, California  
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Check 3633 opposite last page.



CHEMICAL PROCESSING

## The MASTER of DUST in INDUSTRY



**SIMPLE—DEPENDABLE—NO FIRE HAZARD  
HIGH EFFICIENCY—CONSTANT CAPACITY  
LOW HUMIDIFICATION—LOW  
OPERATING COST**

More than one million CFM in ONE plant

Write for Bulletin No. 601 Address

## DUST SUPPRESSION & ENGINEERING CO.

P. O. BOX 67 • LAKE ORION, MICHIGAN

Check 3634 opposite last page.

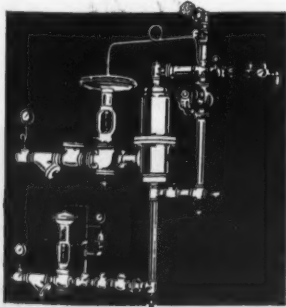
## Get this FREE Bulletin



Shows how Pick Hot Water Heaters quickly and effectively solve hot water problems of many industries.



**MOST ACCURATE,  
FASTEST, SAVES FUEL**



**8 SIZES — 500 to 50,000  
GALS. PER HOUR**

Easily installed in steam and water lines. Usually attached to wall . . . no floor space required . . . no storage tanks necessary.

Volume adjustable from 5% to full rated capacity. Water temperature accurately controlled at any setting, with 20-second reaction to desired up-and-down changes. Operates on high or low-pressure steam.

Write today to Dept. G.

**PICK MANUFACTURING CO., West Bend, Wis.**

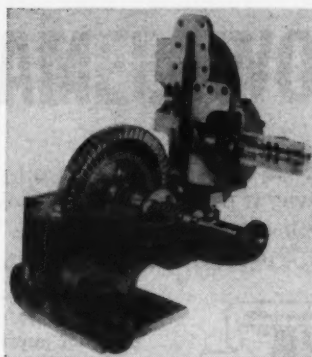
Check 3635 opposite last page.

FEBRUARY 1960

## ENGINEERING & SAFETY

one or the other row of blades.

Two hand-formed nozzles assure proper gas or steam expansion. These are located to activate either row of blades. Safety over-speed trip



Forged one-piece two-row blade of gas-expanding turbine permits reverse rotation when gas or steam is directed against one or the other row of blades

valve is actuated at predetermined speed of 12,000 rpm.

Turbine can also be supplied with one row of blades for non-reversible operation. It is designed for 1 to 45 hp, with 1000 psig max inlet pressure. Mechanical speed governor, manual speed changes and over-speed trip valve are standard.

(GET gas-expanding turbine is product of Dean Hill Pump Company, Inc., 4000 E. 16th St., Indianapolis 7, Ind.)

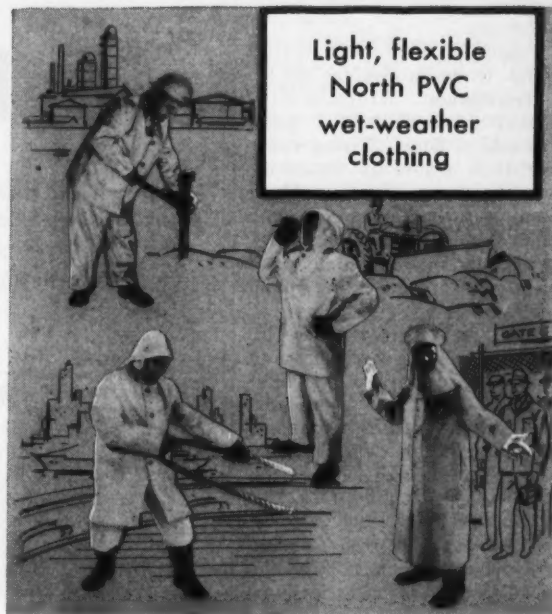
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### WANTED:

#### To Keep You Alive

Almost everyone knows of some tricky unexpected danger situation in his plant. CHEMICAL PROCESSING feels that the dissemination of such information to readers is important. Therefore a monthly series on Chemical Boobytraps is now appearing in this section. (See page 140.) If you know of any such situation, please forward an account of it to:

Safety Editor  
CHEMICAL PROCESSING  
111 E. Delaware Place  
Chicago 11, Illinois



**Light, flexible  
North PVC  
wet-weather  
clothing**

## Here's head-to-toe protection against wind, rain and sleet!

### Welded Seams

Seams are stitched with synthetic thread, then shielded and electronically welded for maximum strength and protection. In addition, buttons are electronically welded in place.

Come hail or high water, your men will stay dry and comfortable in North PVC foul-weather gear by Jomac.

They'll stay dry because North PVC clothing is coated on both sides . . . all points of strain are reinforced . . . and all seams are completely sealed by electronic welding.

And they'll stay comfortable because North PVC clothing is light and flexible . . . and the coats have set-in sleeve design and generous cut that allow full freedom of motion.

North PVC clothing is bright "safety" yellow for maximum visibility and safety. Will not crack, flake or peel, in use or in storage . . . extremely resistant to abrasion and snagging . . . wonderfully easy to clean. Write today for folder showing North PVC clothing line!

Also ask about our complete line of North PVC coated gloves

# JOMAC

JOMAC Inc., Dept. N  
Philadelphia 38, Pennsylvania

"Jomac Sells Quality . . . and Quality Sells Jomac!"

Check 3637 opposite last page.



**Synthetic-rubber pipe  
is electrically heated**

**Uses:** Transporting material such as crude oil, acids, liquids and other semi-solids requiring constant flow temperatures.

**Features:** Pipe will withstand temperatures to 248°F.

**Description:** Electrically heated synthetic-rubber pipe is made of Buna-N hard rubber. It is heated by means of non-circuitous silicone-rubber heating tape. Power is supplied to heating tape by wire cable running parallel to pipe or by inter-connecting pipe sections.

Pipe is manufactured in various length sections and diameters of two to six inches. Sections can be inter-connected via Dresser couplings or other suitable devices. Usually, 10' section of 2" Buna-N pipe weighs roughly 7-½ lb.

Buna-N fittings can be molded in same form as natural hard rubber. Tensile strength per square inch is 6500 lb per ASTM tests. Hardness on the Rockwell L-scale measures 104, on Durometer



Electrically heated synthetic-rubber pipe will withstand temperatures to 248°F

D-scale — 90. Specific gravity is 1.50. Amount of expansion in inches per inch per degree of temperature change (fahrenheit) is  $26 \times 10^{-6}$ .

Among chemicals to which Buna-N can be safely exposed are hydrochloric, sulfuric (56° Bé), hydrofluoric (50%) and nitric acids (16° Bé); sodium hydroxide; sodium chloride; ferric chloride; zinc chloride; zinc sulfate; acetic acid; formaldehyde and carbon bisulfide.

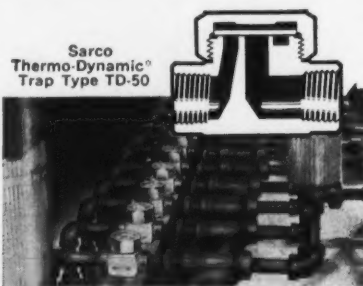
Heating tape was developed by Sunelec, Inc., of Trenton, New Jersey. The Hess Gold-



# SARCO

## NOW... MATCH STEAM TRAPS

**T**HERE'S no such thing as an all-purpose steam trap. That's why it pays to know what each trap has to offer. Here are five examples that demonstrate how you can match the correct steam trap type to the exact requirements of each application.



### EXAMPLE 1: Outside Tracer Lines: A tough set of requirements

One of the most demanding sets of requirements a steam trap has to face is found in *outside steam tracing*. The trap must not only rid tracer lines of condensate and air immediately they're formed, but it must do so under exacting conditions. Pressures on each trap may vary widely. Installations may be remote and inaccessible to service. Water hammer may be a constant threat; freezing may be a hazard. Only the unique Thermo-Dynamic trap takes all these demands in stride. The Sarco TD-50 operates perfectly *without adjustment* through its full pressure range of 10-600 psi. It's virtually immune to water hammer and won't freeze when installed with a free discharge. Maintenance is, therefore,

negligible. Compact, requiring no external support, the TD-50 is just about the easiest trap in the world to install. Once it's installed, you can forget it. You can count on an extremely long, trouble-free service life with minimum maintenance attention.

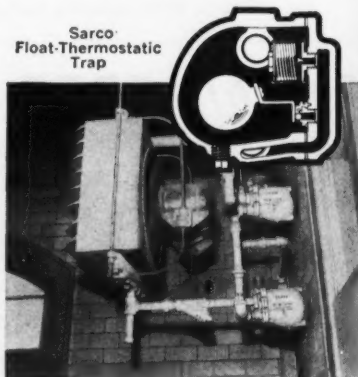
More closely than any other model, the TD-50 approximates an all-purpose trap. However, special application requirements might dictate the use of another type of Sarco trap. Sarco engineers stand ready to help you solve any trapping problems.



### EXAMPLE 2: For steam jacketed process kettles: a trap that operates immediately on start-up and self adjusts to both low and high pressures

When a large steam-jacketed process kettle starts up, the condensate load

is high, and all air in the jacket must be released quickly. At this stage, however, the jacket pressure is low; yet it builds up rapidly as the process continues. Because a SARCO No. 9 Balanced Pressure Thermostatic Trap is wide open on start-up, it releases initial air and condensate without the need for a bypass. And because it is self-adjusting, it works just as efficiently during the first processing stage when the jacket pressure is high. There are no seats to change for various working pressures. You can see why it is the obvious choice for steam jacketed process kettles.



### EXAMPLE 3: How to prevent water-logging in unit heaters and blast coils

All unit heaters and blast coils have a relatively small internal volume in comparison with their steam condensing capacity. Even slight water-logging can reduce heat output seri-

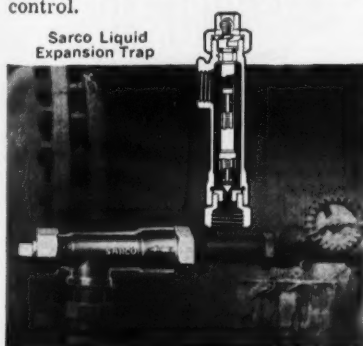
Impartial advice on trapping because  
**ONLY SARCO MAKES ALL 5 STEAM TRAP TYPES**

# TOPICS



## TO YOUR TRAPPING NEEDS

ously. Pressures may vary widely under automatic temperature control and so may the load because of variable demand. A trap to handle this application must adjust itself instantly to pressure and load charges. The most precise answer to this problem is the SARCO Float and Thermostatic Trap—and here's why: it releases air on start-up and during running, and, because it discharges condensate continuously, it does not set up in the system violent pressure changes that would upset close control.



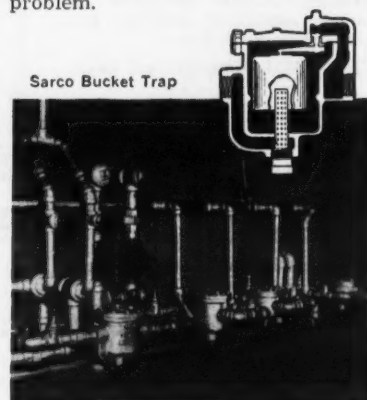
### EXAMPLE 4: How to release low temperature condensate

When condensate cannot be returned to the boiler feed tank either because of distance or because it may be contaminated, it's economical to utilize some of the sensible heat as well as the latent heat of the steam.

For this purpose a trap must be capable of releasing condensate to temperatures as low as 100° F.

The sound trap selection here is

the SARCO No. 871 Liquid Expansion Trap because it can be set to release condensate at temperatures down to 100° F. regardless of supply pressure. This performance assures maximum steam economy. The Sarco No. 871 handles the starting load easily because of its wide open valve, which throttles the flow as the condensate temperature rises. Furthermore waterhammer cannot reach the operating element. No other type is as nearly perfect for this specific problem.



### EXAMPLE 5: Economic handling of Water Hammer and Corrosive Conditions

In applications in which water hammer or corrosive conditions are encountered but in which low pressures or extremely high back pressures preclude the use of the Thermo-Dynamic trap, the Sarco Inverted Bucket Trap is recommended. While

the Sarco I. B. is not exactly a fuel miser, its relatively rugged construction will withstand considerable water hammer; and, when it is fitted with stainless steel internal parts, it offers excellent resistance to corrosion.

\* \* \*

### CONCLUSION: The right application is the economical installation

When you choose steam traps that serve their purpose without frequent adjustment, and without maintenance or replacement problems, you save on down-time, man-hours, spare parts, and production slowdowns.

You can get the money-saving solution to every trap selection problem by consulting Sarco. You get impartial solutions, because only Sarco makes all 5 types of steam traps: Thermo-Dynamic\*, Thermostatic, Float Thermostatic, Liquid Expansion, and Bucket.

You also get the benefit of Sarco's 50 years of specialized experience in the manufacture and application of temperature regulators, industrial air vents, pipeline strainers, dial and industrial thermometers, heating and cooling controls, heat exchangers, heating control systems and heating specialties.

For literature or impartial help in solving your steam trapping or control problems, contact your local Sarco Sales Representative, or write direct to Sarco.

1440

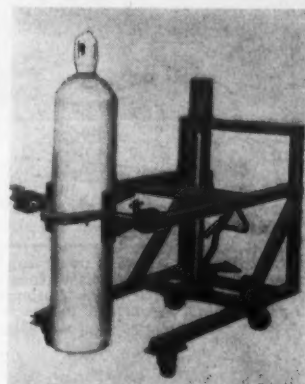
\*U.S. Pat. No. 2,817,353, I.M. Reg. U.S. Pat. Off.

## ENGINEERING & SAFETY

smith Company, Horace Linton Division, a member of Burlington Industries, manufactures special fibrous glass tape which is basic component of the Sunelec heating device. The tape is produced by impregnating the woven-glass tape with silicone rubber produced by Union Carbide Corporation.

(Heated synthetic-rubber pipe is product of Luzerne Rubber Company, Muirhead Avenue, Trenton, N.J.)

Check 3639 opposite last page.



### Careful cylinder handling

... is possible with clamp, which is used with a hydraulic drum lift. Clamp attachment permits safe handling of cylinders containing chlorine, butane and similar dangerous materials.

It is readily interchangeable in drum lift and can accommodate cylinders of 14½ to 15½" in diameter. It permits raising and rotation of cylinders for emptying purposes. Special clamps can be made for cylinders of other diameters.

(Hydraulic drum lift BM-3 and cylinder clamp are products of Sterling Fleischman Co., Box 94, Broomall, Pa.)

Check 3640 opposite last page.

# SARCO COMPANY, INC.

635 Madison Avenue,  
New York 22, N. Y.  
Plant: Bethlehem, Pa.

Check 3638 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.



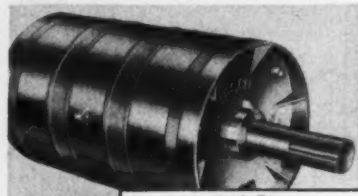
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# ERIEZ

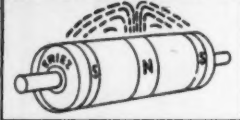
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**MAGNETIC  
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Now in 2 "duty-rated" designs—to give you the finest automatic separation for your exact application—fine iron or tramp iron removal.

**NEW, EXPANDED LINE!** New design, new magnetic efficiency permit increased operating range and effectiveness with 2 different magnetic actions. Peak protection for all operations—from rugged crusher protection through delicate product purification operations.



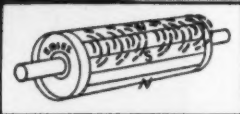
**MODEL CR  
(Radial)  
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For removing large pieces of tramp iron from heavy depths of flow. Provides a strong, deep magnetic field of equal intensity around the full periphery. 12" through 36" diameters.



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(Axial)  
PULLEYS**



Excellent for fine iron separation, as well as small and medium pieces of tramp iron, in average material flows! Strong magnetic field of equal force extends across the full width of the pulley. 8", 12", 15", & 18" diameters. Prevent product contamination, machinery damage, fires, explosions, downtime. 2 designs, 4 magnetic strengths, 8 diameters, 14 belt widths. No operating or maintenance costs. For all materials, wet or dry, on belts of non magnetic material. Fast, simple installation.

\*Erium—an exclusive, high quality permanent magnetic power source specifically designed and energized by Eriez.

New fact-filled 6-page bulletin has installation photos, selector guide, etc. Write today! Eriez Mfg. Co., 73-BB Magnet Drive, Erie, Pa.



\* Check 3641 opposite last page.

## NEW LITERATURE

Plant Engineering, Maintenance & Safety

**Speed reducers** of helical-gear type are cataloged in 20-page booklet, which incorporates detailed structural photographs and selection data, along with specification tables and schematic drawings. Book 2751—Link-Belt Company.

Check 3642 opposite last page.

**Sodium-chlorite product**, to control slime in paper mills, is subject of four-page data sheet which gives information on application, storage and handling of slumicide. "C2 for Slime Control in Paper Mills"—Market Development Department, Chemicals Division, Olin Mathieson Chemical Corporation.

Check 3643 opposite last page.

**Teflon shaft seals**, for shaft sizes of 1/4 to 3", are itemized in Bul S-233—Crane Packing Company.

Check 3644 opposite last page.

**Valve line** is broken down, by material and pressure class, and classified by type, disc design, seating arrangement, stem operation, bonnet and end connection, in "Buyers Guide"—The Ohio Injector Company.

Check 3645 opposite last page.

**Gas-mask selection** is aided by information in a circular describing fitting, leakage, maintenance and other pertinent topics. "How To Select A Gas Mask"—Acme Protection Equipment Co.

Check 3646 opposite last page.

**Diethylenetriamine** safe-handling procedures are detailed in a data sheet which covers properties, hazards, employee safety, handling and storage, tank cleaning, waste disposal, medical management, and first aid. Safety Data Sheet SD-76 is available at 30¢ per copy from Manufacturing Chemists' Association Incorporated, 1825 Connecticut Ave., N. W., Washington 9, D. C.

**Interrupting capacity chart** enables users of circuit breakers to select and order proper breaker for each application. Chart SA-8163-A—Westinghouse Electric Corporation.

Check 3647 opposite last page.

**Outdoor floodlights** of cast aluminum are depicted in eight-page catalog which includes illustrations, specifications and dimensional drawings. Cat S—Stonco Electric Products Company.

Check 3648 opposite last page.

**Chromium and titanium** and their alloys are subjects of four recent publications. Two data sheets outline properties of a titanium alloy made from electrolytic titanium and electrolytic chromium (EP 90-10) and titanium alloy made from electrolytic titanium, electrolytic vanadium and aluminum (EP 20-2). Chromium and its alloys and titanium and its alloys are subjects of two four-page bulletins. Chromium Bul, Titanium Bul, and EP 90-10 Alloy and EP 20-2 Alloy Data Sheets—Manganese Chemicals Corporation.

Check 3649 opposite last page.

**Molded packings** of V-type, consisting of three or more nested rings, are detailed in eight-page Tech Bul PY-959—Greene, Tweed & Co.

Check 3650 opposite last page.

**Explosions** in pipelines and compressor-starting air lines are subject of eight-page bulletin, which includes detailed discussion of various aspects of problem. Bul 173—Clark Bros. Co.

Check 3651 opposite last page.

**Ovens**, of laboratory, pilot-plant and small-batch-production types, are fully covered in a catalog which is conveniently tab-indexed. Detailed information is presented on variety of models. Oven Cat—Despatch Oven Company.

Check 3652 opposite last page.

**Woven cotton belting** is reviewed in 16-page manual, which gives standards, characteristics, and applications for untreated, synthetic-rubber-impregnated, and wax- or bituminous-impregnated belting. "Solid Woven Cotton Belting"—Woven Fabric Belting Manufacturers Association, Inc.

Check 3653 opposite last page.

**Handy reference** for engineers is eight-page pamphlet which includes tables of engineering constants, short-cuts and formulas. "... Engineering Constants"—First Machinery Corp.

Check 3654 opposite last page.

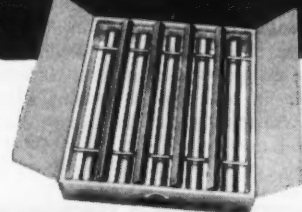
**Chemical cleaning products** are outlined in 20-page technical bulletin, which incorporates sections on power-plant cleaning, stainless-steel cleaning, cleaning aluminum metal and alloys, alkaline derusting and paint stripping, cleaning cast iron-glass forming molds, bottle washing, general chemical cleaning and packaging. Tech Bul 102—Chas. Pfizer & Co., Inc.

Check 3655 opposite last page.

# ONLY ERIEZ

has a complete line of  
Erium Powered  
**GRATE MAGNETS**  
designed specifically to

## STOP TRAMP IRON and IRON FINES



**ONLY ERIEZ** Grate Magnets offer the widest selection of models, sizes and construction in the widest price range—all powered by ERIUM, an exclusive high quality permanent magnetic power source specifically designed and energized by Eriez.

**ONLY ERIEZ** has units designed for your exact needs—with the most effective, most powerful magnetic fields—protected by U. S. and foreign patents.

**ONLY ERIEZ**—world's leading producer of magnetic equipment for industry—has the experience and know-how to provide the most effective Grate Magnets:

**For tramp iron separation**—Eriez Alnico-powered Grate Magnets proved stronger than all comparable units in extensive, controlled tests. Alnico is also highly effective for fine-iron separation.

**For fine-iron separation**—Eriez Ceramic Grate Magnets proved best for efficient, economical removal of fine-iron in free-flowing materials.

All Eriez Grate Magnets are non-electric, self-contained. Operate without any wires or attachments. Designed to prevent choking possibilities caused by bridging of iron and material accumulation. First cost is only cost. Ruggedly constructed; magnetic tubes permanently secured to frame, can't fall into flow line. No operating or maintenance costs. Available in: Wing-Type, Drawer-Type, Multiple-Bank, Rotary-Type, Odd-shaped Models, Housed Units, and Housed Vibratory Units.

Get all the facts... Write today  
Eriez Mfg. Co., 73-BA Magnet Dr., Erie, Pa.



Check 3656 opposite last page.

CHEMICAL PROCESSING



the finest  
COATED FABRIC  
WORK GLOVE  
in the world

# SURETY SILVERTEX

To handle those hot, tough jobs nothing equals Surety Silvertex Gloves for longer wear and lower cost. Superior Silvertex coating reflects heat and affords better protection against most industrial chemicals than rubber and standard synthetics. Their curved finger design and wing thumb construction cuts wear and gives greater comfort. And they won't crack or peel—remaining soft and pliable for the life of the glove.

Available in gauntlet, knit wrist, band top and safety cuff styles, all in jumbo sizes and with or without ventilated backs. For a free test pair write on your letterhead, outlining your job requirements. We'll send them to you by return mail.

THE **SURETY** RUBBER COMPANY  
CARROLLTON, OHIO

In Canada: Safety Supply Co., Toronto

Check 3657 opposite last page.

## FOR OIL-FREE FILTRATION



### "DA" Dry-Type

Gives better than 98% efficiency on 2-micron mean diameter particles and 100% filtration on 5-microns or larger. Suitable for installations where—oil-free air is required; extremely high degree of filtration is required; where air velocity varies from one period to another; where dirt concentration is relatively low. Can be sized to meet any pressure drop requirement. Ask for Bulletin DA-1056.

## AIR-MAZE

The Filter Engineers

Dept. CP-2 Cleveland 28, Ohio  
Subsidiary of ROCKWELL-STANDARD Corporation

Check 3658 opposite last page.

FEBRUARY 1960

## ENGINEERING & SAFETY

Heat-exchanger tube of carbon steel is reviewed in eight-page bulletin, incorporating information concerning quality control utilized in production of tube. Bul TB-431—Tubular Products Division, The Babcock & Wilcox Company.

Check 3659 opposite last page.

Variable-speed motor drives receive full treatment in 96-page catalog, which includes detailed drawings, specification tables and photographs. Cat M-592 may be obtained by writing on company letterhead to Reeves Pulley Division, Reliance Electric and Engineering Company.

Fire extinguishers, of high-pressure carbon-dioxide type, are pictured in four-page Folio 8-1—Cardox, Division of Chemetron Corporation.

Check 3660 opposite last page.

Heating-coil construction and operation are featured in 32-page bulletin, incorporated graphs, charts and illustrations for standard-steam, hot-water, steam-distributing and double-distributing coils. Bul HC-102—American Air Filter Company, Inc.

Check 3661 opposite last page.

Fire prevention and protection in industrial plants is treated in 190-page manual prepared by Navy's Bureau of Yards and Docks. Basic fire-prevention measures are covered, including requirements for construction, emergency and protective features, and safeguards against common hazards. Special fire hazards are also discussed. Copies of PB 151695, "Fire Prevention and Fire Protection," Bureau of Yards and Docks, U. S. Navy, may be ordered at \$3.00 per copy from OTS, U. S. Department of Commerce, Washington 25, D. C.

MENTAL HOSPITAL  
FOR  
COMPUTING MACHINES  
(ENTRANCE)



## 2 New RIGID Tubing Cutters



### RIGID No. 205 Tubing Cutter

Time-Saving, Slide-to-Size 1/8" to 2 3/8" O.D. Capacity

Made of lightweight, high-strength cast aluminum alloy, you'll find these new RIGID Tubing Cutters extra handy. Slight push on handle of large-size-range RIGID No. 205 snugs cutter wheel against tubing . . . locks it in position until released. Feed screw fully protected and enclosed . . . always feeds into tube with easy handle turn . . . can't jam with chips or dirt. Wheel gives quick, clean cuts of copper, brass, aluminum tubing and thin-wall conduit . . . no burr. Grooved rollers give easy flare cut-offs without tubing waste. Tubing always turns freely on 2 of 4 Rollers. Rollers smooth tubing ready for soldering. Fold-in reamer always handy. Spare Cutter wheel in handle. Wheel for plastic and aluminum pipe available for No. 205 only

Conform to Fed. Spec. GGG-C-771b Type II—Class I—enclosed feed mechanism

### RIGID No. 105 Tubing Cutter



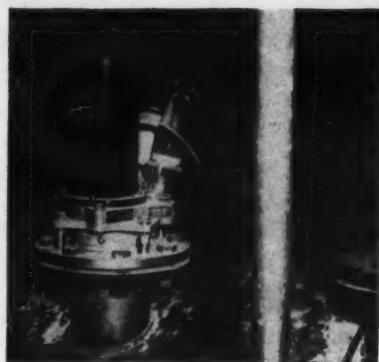
Protected Feed Screw  
Always Easy-Turning  
1/8" to 1 1/8" O.D. Capacity

To save time and tubing, order these new RIGID Tubing Cutters today! Your Supply House has them!

## RIGID

Check 3662 opposite last page.

## YES, NOW VISCOSITY



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## BROOKFIELD VISCOMETRAN

**U**NDER actual process conditions, the Brookfield Viscometran accurately and continuously measures, records and controls viscosity. Readily mounted and integrated in existing processes, the Viscometran offers significant economic advantages over other methods of indicating degree of reaction, degree of polymerization or determination of process end point.

Viscosity is very likely a variable that is fundamental in your process. For complete information about how the Brookfield Viscometran can provide continuous "in process" measurement of this product dimension for you, write—

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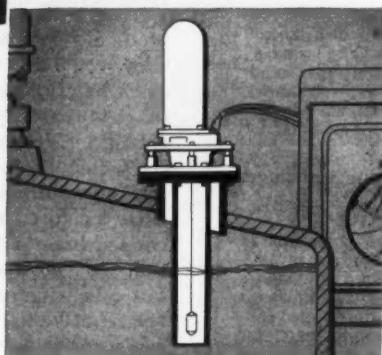
BROOKFIELD VISCOMETRANS NOW SUCCESSFULLY USED FOR CONTROLLING:  
Asphalt • Caramel • Cement slurries • Durez-resin-acetone slurries • Gluten slurries • Lignum-based polymers • Molten  $P_2S_5$  • Paper coatings • Polystyrene • Polyurethane resins • Urea-formaldehyde resin

Check 3663 opposite last page.



CAN BE CONTINUOUSLY

## PROCESS CONTROLLED



## ENGINEERING & SAFETY

Steam traps, pressure reducers and pressure regulators are described in tabbed and indexed form in a catalog, concerned with applications, capacities, sizing and selection, preventive maintenance and trouble shooting. Steam Trap and Regulator Cat—Dept. C, The Clark Manufacturing Company.

Check 3664 opposite last page.

Industrial fans are reviewed in 28-page bulletin, which includes complete rating tables for line, giving volumes of delivered air, rpm, hp at various static pressures, and outlet velocity and velocity pressures. Bul L-5—Lehigh Fan & Blower Division, Fuller Co., Subsidiary of General American Transportation Corporation.

Check 3665 opposite last page.

Agitating-circulating pumps are specified in 12-page bulletin which includes application information. Bul 254—Warren Pumps, Inc.

Check 3666 opposite last page.

Variable-transformer series is subject of three-page Bul P559—Dept. 126, The Superior Electric Company.

Check 3667 opposite last page.

PVC industrial gloves are pictured in four-page bulletin, which includes table of performance characteristics under various conditions. "PVC Industrial Gloves"—Jomac Inc.

Check 3668 opposite last page.

Magnetic-disc brakes are specified on single-page Special Information Sheet 2—Stearns Electric Corporation.

Check 3669 opposite last page.

Furnace-flame-failure units are delineated in a bulletin which gives unit's working principles. Bul 523—Photomation Inc.

Check 3670 opposite last page.

Multi-person showers are depicted in eight-page bulletin, which includes detailed application photographs and specifications. "Bradley Group Showers"—Bradley Wash-fountain Co.

Check 3671 opposite last page.

Self-hazard-evaluation information, concerning propylene oxide, tetrahydrofuran, polonium 210, radon, selenium and titanium, is available in individual bulletin form, at 25¢ per item, with discount of 20% for five or more, from American Industrial Hygiene Association, 14125 Prevost, Detroit 27, Mich.

## PUMP PROBLEMS

write

## TABER

BEFORE  
DECIDING  
ON TYPE  
OF  
PUMPS . .

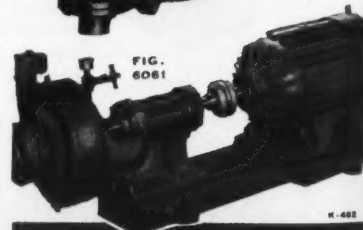
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pump, Bulletin  
C-355.

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## TABER

Check 3672 opposite last page.

CHEMICAL PROCESSING

# CLASSIFIED SECTION



\$3,000,000 Liquidation — Chemical Plant at Orange, Texas. Type 316 Stainless Steel Tanks, Kettles, Heat Exchangers, Columns, Still, Crystallizers, Centrifugals, Pumps, Valves, etc. WONDERFUL VALUES, SEND FOR LIST.

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Capsules are in their original shipping cartons and have been stored under ideal storage conditions. Samples available. Prefer to sell complete inventory, but will consider selling as separate item. Reply to Box #21 CHEMICAL PROCESSING, 111 E. Delaware Pl., Chicago 11, Ill.

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These positions are in the fields of intermediates, nylon fibers and plastics. Complete pilot plant facilities are available, and the work offers real challenge and opportunity for personal growth.

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These units are NOT to be shipped into our New York shops and then reshipped to destination. You save such costs as rigging, double handling, freight charges, etc.

**NEW YORK STATE** (outside of New York City) Bowen Stainless Steel Laboratory Spray Dryer—Complete Robinson Size 17 Blender; 66"x14"; 380 cu.ft. Center Disch. J.H. Day Jacketed Mild Steel Double Ribbon Mixer; 4'x8' Acme Stainless Steel Concentrator or Dryer; Cont. Type consisting of 4 Units 24" x 10' mounted horizontally; 20 HP Rotary Dryer in Monel; 4" Dia. x 30' long, complete Jacketed Rotary Dryer or Roaster 4'x12'3"; Monel shaft-blades Bucket Elevator with Stainless Steel contact parts Rubber Lined Mixing Tanks, Crystallizers, Evaporators to 800 Gal. Special Lot of CHEMICAL PUMPS; Durimet, Duriron, Olivite etc. Oliver Pressure Precoat Rotary Vacuum Filters; 8'x8', 8'x10' Rotary Cooler 3'x15' with Feeder and accessories 6 Southwark Hydraulic Presses; 36"x36" Platens; 14" Ram

**NEW JERSEY** Feinc Stainless Steel Rotary Filter 5'x6'; string type Patterson 1000 Gal. Dissolver; 84"x48"; 20 HP Unipower Stainless Steel Rotary Dryer 4'x20' with Oil Burner, etc. Bird Young Rotary Vacuum Filter 4'x4' with stainless leaves Stainless Lined Heavy Duty Tanks; 11,000 Gal. 10'x18'7" Stainless Steel 7000 Gal. Horizontal Tanks; 6'x34' Gehrich Truck Dryer; 12'x24'x7'6"; with 24 Trucks-Trays, etc. Shriver 42" x 42" Filter Presses; 4 eye; closed delivery Consolidated Capem Automatic Capper Model C4F complete

**OHIO** Fatty Acid, Lurgi Type Distillation System including Ni-Resist Still Pots, Stainless Heat Exchanger, Vapor and Barometric Condensers, Receivers, Cooling Tanks, etc. International Porcelain Lined Pebble Mills 8'x8' 50 HP gearmotor Abbe Porc. Lined Pebble Mills; 30"x30"; 30"x42"; 37"x48"

**ALABAMA** Swenson Quadruple Effect Long Tube Evaporator of the Vertical Film Type; 5 Bodies

**INDIANA** NEW Unused F-B Two Roll Rubber or Plastic Mills 14"x30" with or without Uni-Drives

**CALIFORNIA** Steel Reaction Kettle 1500 Gal; Jacketed; 6'x5'x2" Louisville Stainless Steel Dryer 30" x 28' complete Glass Lined Agitated Tank; 6'x7' with 3 HP XPL motor Jacketed Steel Ball Mill; 5' x 2'6" Abbe 6'x6' Buhrstone Lined Pebble Mill; 25 HP

**ONTARIO CANADA** Stokes Impregnators (2 Tanks ea. 62"x6') Model 36-48 complete

**WEST VIRGINIA** 4 Struthers Wells Type 316 Stainless Steel Jacketed, Agitated Reactors; 6'x10'x14' Overall

**VIRGINIA** Oliver Pressure Precoat Rotary Vacuum Filters 5'3"x8' STAINLESS Oliver Pressure Precoat Rotary Vacuum Filters 5'3"x3' Steel

**RHODE ISLAND** Type 316 Stainless Steel 250 Gal. Crystallizer; 85"x24" with Anchor Type Agitator; Bolted head; 24" Manhole Patterson Kelly Twin Shell Stainless Steel Blender; 150 cu.ft. Motorized 10 HP Pfaudler Thimble Condenser; Glass Lined; Ddl. Jktd. 26 sq.ft. International Porc. Lined Pebble Mill; 5'x6'; 15 HP Motor Stainless Steel Cyclone Collector; 6'x7' J. P. Devine Lab. Vacuum Dryer Model "O"; 20" dia. x 3' long Shriver Aluminum Filter Press, 24"x24", 24 Chamber, 4 eye, cl. del. Multi-Pass Stainless Clad Dryer, 4 10' sections, 12" Jktd. screw con. Pfaudler Glass Lined 150 Gal. Evaporating Dishes; 60"x24"

**MASSACHUSETTS** Blaw-Knox Tumbling Cone Type Blender, 300 cu.ft. 9'6"x45" Complete Abbe Steel Ball Mills; 42" x 32"; 60" x 48"

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## manufacturers' current literature

This section features a variety of literature currently available from manufacturers. See also the other sections in this issue for new literature pertaining to those particular sections

### Valves

**Butterfly valves**, which can be operated manually or by automatic remote control, are available in sizes of 2 to 48". They are outlined in Bul 583—W. S. Rockwell Company.

Check 3673 opposite last page.

**Pinch-type valves** are itemized in 16-page catalog which includes photographs, specification tables and drawings. Cat 857—RKL Controls, Inc.

Check 3674 opposite last page.

**Butterfly valve**, which fits between pipe flanges of fluid or gas line, needs no gasket because faces, as well as inside of valve body, are covered with rubber permanently bonded to metal. Valve description is incorporated in 26-page Bul 10-AM—Henry Pratt Company.

Check 3675 opposite last page.

**Valved couplings**, available in standard sizes of ¼ to 6" ID in variety of materials are depicted in Cat 58—Snap-Tite, Inc.

Check 3676 opposite last page.

**Butterfly valve** is expanded upon in Type-480 Butterfly Valve Bul—Fisher Governor Company.

Check 3677 opposite last page.

**Ball valves**, available in 303 and 316 stainless steel, alloy 20, carbon steel, bronze, ductile iron, aluminum and PVC, are clarified in "At Your Service" Literature—Jamesbury Corp.

Check 3678 opposite last page.

### Corrosion Control

**Chemical-plant** and oil-refinery equipment require alloy steels, in variety of combinations. These are presented in Alloy Equipment Literature—Sun Shipbuilding & Dry Dock Company.

Check 3679 opposite last page.

**Corrosion-resistant** coatings for processing equipment are itemized in Bul 760—U.S. Stoneware.

Check 3680 opposite last page.

**Teflon tube connectors**, available in sizes to fit 3-mm through 12-mm glass tube, are subject of Teflon Tube Connector Bul—Pennsylvania Fluorocarbon Co., Inc.

Check 3681 opposite last page.

**Copper-base-alloy** tube, pipe and fittings, sheet, plate and other products are described in Copper-base Alloy Information—Ampco Metal Inc.

Check 3682 opposite last page.

**Rubber-lined products**, including tanks, pipe and process equipment, is considered in Cat 7115—Manhattan Rubber Division, Raybestos-Manhattan, Inc.

Check 3683 opposite last page.

**Products of stainless steel** and corrosion-resistant metals are reviewed in Alloy Products Literature—Alloy Products Corp.

Check 3684 opposite last page.

**Valves** for handling corrosive and hazardous processing fluids are reviewed in Gear-Vac® Valve Bul and Chemical-dispensing Valve Bul—Eco Engineering Company.

Check 3685 opposite last page.

**Flexible-valve** technical data (FL-1116R) and uses (FL-935) are contained in Buls FL-1116R and FL-935—Farris Flexible Valve Corp.

Check 3686 opposite last page.

**Pump**, in which all wetted parts are acid-resistant is discussed in Bul CE-55—American Hard Rubber Co., Div. of Amerace Corp.

Check 3687 opposite last page.

**Teflon tank linings** protect against harsh corrosives and extreme temperatures. They are treated in Teflon Lining Literature—The Garlock Packing Company.

Check 3688 opposite last page.

**Pumps** for handling corrosive and hazardous processing fluids are subject of several publications. All-Chem® Rotary Pump Bul, Centri-Chem® Centrifugal Pump Bul, Gearchem® Gear Pump Bul, Minilab® Rotary Pump Bul and Pumpmobile® Portable Pump Bul—Eco Engineering Company.

Check 3689 opposite last page.

**Glass-lined processing equipment**, including reactors, columns, storage tanks, rotary dryer-blenders, pipe and fittings, is discussed in Glass-lined Processing Equipment Literature—Glascote® Products, Inc., Subsidiary of A. O. Smith Corporation.

Check 3690 opposite last page.

**Filter pump units**, which handle all acid, alkaline solutions and solvents at temperatures up to 250°F, are presented in eight-page Bul M-1—Sethco Manufacturing Corp.

Check 3691 opposite last page.

**Fluoroflex-TS** pipe has liner formed over full gasket face of flange for corrosion protection over temperature range of -100 to 500°F. It is depicted in Bul TS-1A—Resistoflex Corporation.

Check 3692 opposite last page.

**PVC pipe**, in schedules 40, 80 and 120, ½ to 4", threaded or socket-weld fittings, and valves in sizes of ½ to 2", are outlined in Bul CE-56—American Hard Rubber Company, Division of Amerace Corporation.

Check 3693 opposite last page.

**Teflon shaft packings**, for use on either centrifugal or reciprocating pumps at speeds to 3600 rpm and temperatures of -118 to 525°F, are covered in Bul CP 552—Chemical & Power Products, Inc.

Check 3694 opposite last page.

### Processing Equipment

**Heat-exchanger** standard-terminology need has been met in 120-page manual, which illustrates and describes components of shell and tube heat exchangers commonly used in processing. Complete system of interchangeable front heads, shells and rear heads is established. Fundamentals of heat transfer and design are reviewed. Heat-exchanger Manual—Heat Exchanger Division, Patterson-Kelley Co., Inc.

Check 3695 opposite last page.

**Vapor condenser**, which mounts directly on steel structure of evaporator or distillation column, is explained in Bul 129—Niagara Blower Company.

Check 3696 opposite last page.

**Atomized-spray blending** is expanded upon in Atomized Spray Data—Paul O. Abbe, Inc.

Check 3697 opposite last page.

**Vacuum-operations** flow diagrams are included in 35-page Cat 1462—Process Equipment Division, C. H. Wheeler Mfg. Co.

Check 3698 opposite last page.

**Clarifiers**, are used to clear up surface water—removing organic matter, hardness, alkalinity and similar conditions. They are presented in Clarifier Literature—Illinois Water Treatment Company.

Check 3699 opposite last page.

**Nitrogen** atmosphere generator utilizes principle of burning a hydrocarbon fuel in separate catalytic combustion chamber to obtain complete reaction without unburned methane, high residual oxygen, or high percentages of oxides of nitrogen. Unit is covered in four-page Bul 197—Gas Processing Division, Lindberg Engineering Company.

Check 3700 opposite last page.

**Filter line**, which comes in wide variety of materials and several types of elements with filtration areas of 5 to 500 sq ft, is considered in ClaRite Filter Bul—Croll-Reynolds Engineering Co., Inc.

Check 3701 opposite last page.

**Processing equipment** for sizing, mixing, weighing, classifying, conveying and screening, is incorporated in Chemical Industry Equipment Bul—S. Howes Co. Inc.

Check 3702 opposite last page.

**Mixing, grinding, dispersing** equipment, including variable-speed double-planetary change can mixer, one-gal vacuum-tight mixer, one-pt double-arm kneader, and disperser, are subjects of Can Mixer 130-EL, Vacuum-tight Mixer 130-EL, Kneader 41A, and Disperser 140-DL Buls—Chas. Ross & Son Co., Inc.

Check 3703 opposite last page.

**Mixer** users, who have perfected their own controlled dispersion processes on over 100 different mixing applications are tabulated in User Application List—Simpson Mix-Muller Division®, National Engineering Company.

Check 3704 opposite last page.

**Fully automated filter** is 1120-sq ft model which operates itself automatically throughout entire cycle of precoating, filtering, blowdown and cake discharge. Filter, which duplicates cycle repeatedly, unattended, is clarified in MCBS Filter Bul—Sparkler Manufacturing Co.

Check 3705 opposite last page.

Electric, gas, steam ovens, of bench, cabinet, truck and conveyor types, are presented in Bul 127—W. S. Rockwell Company.

Check 3706 opposite last page.

## Fluids Handling

**Fittings, flanges, unions** come in small cartons, of restricted weight. Complete data on quantities and weights of items, as packaged in various sizes of cartons, are outlined in Folder PF-1—Henry Vogt Machine Co.

Check 3707 opposite last page.

**Pumps**, for moving corrosive liquids, pumping two or three different liquids simultaneously, feeding and mixing, or metering additives, are outlined in Pump Information—Sigmamotor, Inc.

Check 3708 opposite last page.

**Steam trap**, which continually samples fluid in line to maintain condensate discharge close to steam temperature, eliminating condensate as soon as it forms, is among items discussed in "The Why and How of Steam Trapping"—Yarnall-Waring Co.

Check 3709 opposite last page.

**Ferrous traps** of permanent non-electric-magnetic type withstand pressures to 150 psi and are effective with materials to 750°F. Information on these can be found in Ferrous Trap Literature—Eriez Mfg. Co.

Check 3710 opposite last page.

**Steam-jet vacuum pumps** are subject of Vacuum-jet Vacuum Pump Literature—Croll-Reynolds Co., Inc.

Check 3711 opposite last page.

**Flexible connectors** of stainless steel, which are available in all standard sizes through 16" in any required length, are tabulated in Alliflex Bul—Allied Metal Hose Company.

Check 3712 opposite last page.

**Seal-less-pump** relative head-capacity performances are illustrated on Composite Curve—Chempump Division, Fostoria Corporation.

Check 3713 opposite last page.

**Shaft seals** for variety of services are presented in Bul S-204-3—Crane Packing Company.

Check 3714 opposite last page.

**Steam-trap** capacity ratings and data on how to correctly size, install and maintain steam traps, for any pressure, temperature and load, are included in 48-page Steam Trap Book—Armstrong Machine Works.

Check 3715 opposite last page.

**Positive-displacement pumps**, suitable for all paints, inks and other abrasive liquids of 100 SSU to heaviest viscosities, are treated in single-page Data Sheet SP-507—Viking Pump Company.

Check 3716 opposite last page.

**Spray-nozzle data**, on material, dimensions, flow rate, pressure and angle of spray, for each of hundreds of spray nozzles in line, is tabulated in Spray Nozzle Profiles—Spray Engineering Company.

Check 3717 opposite last page.

## Plant Engineering and Maintenance

**Extending equipment life** by means of hard-surfacing is discussed in two publications. Spray-welder Cat and Colmonoy Hard-surfacing Manual 79—Wall Colmonoy Corporation.

Check 3718 opposite last page.

**Oil reclaimer** removes solids, acids, volatile impurities, moisture, solvents and gases by heat-vacuum process. It is presented in Oil Reclaimer Bul—The Hilliard Corporation.

Check 3719 opposite last page.

**Water stills** are subject of Bul IC-601—Industrial and Scientific Division, American Sterilizer.

Check 3720 opposite last page.

**Electric heating** is considered in Electric Heating Literature—Edwin L. Wiegand Company.

Check 3721 opposite last page.

**Metal gratings** to provide 75%-open coverage of trenches which have sub-surface pipe and valves, are incorporated in Grating Cat—Irving Subway Grating Company, Inc.

Check 3722 opposite last page.

**Air and gas compressors**, which can be obtained in many combinations of compressor crank-throws, cylinder arrangements and staging, are itemized in Compressor Bul—Chicago Pneumatic.

Check 3723 opposite last page.

**Wire cloth**, for filtration, straining, screening and catalyst applications, is specified in Bul 10—The Cleveland Wire Cloth & Mfg. Co.

Check 3724 opposite last page.

**Ventilator**, for tanks, tank cars, drums, pipe galleries and similar applications, is presented in Ventilator Information—Coppus Engineering Corporation.

Check 3725 opposite last page.

**Variable-speed drives**, which utilize metal, self-tooth-forming chain, are treated in Book 2274—Link-Belt Company.

Check 3726 opposite last page.

**Blowers**, incorporating three-lobe design, are available in capacities of 50 to 4000 cfm for pressures to 14 psig (single) and 70 psig (multi-stage). They are delineated in Blower Information—M-D Blowers, Inc., Subsidiary of Miehe-Goss-Dexter, Inc.

Check 3727 opposite last page.

**Wire cloth and screen**, available in hundreds of weaves and sizes, is tabulated in Condensed Screen Reference Cat—Ludlow-Saylor Wire Cloth Company.

Check 3728 opposite last page.

**Condensed Screen Reference Cat** is also available from Star Wire Screen & Iron Works.

Check 3729 opposite last page.

**Wire cloth**, manufactured in any metal or alloy including titanium in nine basic weaves, is tabulated in Wire Cloth Cat—The Cambridge Wire Cloth Co.

Check 3730 opposite last page.

**Explosion-proof lighting** fixtures, of mercury-vapor type for hazardous locations of UL Class 1, Groups C and D, are detailed in Explosion-proof Lighting Fixture Bul—Appleton Electric Company.

Check 3731 opposite last page.

**Dryers**, which can be incorporated with gas generators to provide dry controlled atmospheres, are delineated in Drying Literature—Pittsburgh Lector-dryer Division, McGraw-Edison Company.

Check 3732 opposite last page.

**Oil filters** are depicted in Oil Filter Bul—The Hilliard Corporation.

Check 3733 opposite last page.

**Wire cloth**, available in over 53,000 different specifications, is summarized in Wire Cloth Literature—The W. S. Tyler Company.

Check 3734 opposite last page.

**Fuseless air-break starter** gives 100/150 mva fault protection. Unit is introduced in Bul 8130A—EC&M Division, Square D Company.

Check 3735 opposite last page.

## Separation and Size Reduction

**Three-roll mill** with water-cooled rolls and dry grinding mill, with one-inch feed size ground between 1/8" and 100 mesh, are subjects of Three-roll Mill 52LC and Dry Grinding Mill 70 Buls—Chas. Ross & Son Co., Inc.

Check 3736 opposite last page.

**Fluid-energy mills** can control fineness and product quality while simultaneously dehydrating, coating, blending and achieving chemical changes. These units are detailed in Jet-O-Mizer Mill Bul—Fluid Energy Processing & Equipment Company.

Check 3737 opposite last page.

**Air-separation formulas** are outlined in Air Separation Booklet—Rubert M. Gay Division, Universal Road Machinery Co.

Check 3738 opposite last page.

**Electric-screen** operating principles and applications are outlined in 24-page catalog which lists types of screens available. Cat 83—The W. S. Tyler Company.

Check 3739 opposite last page.

**Centrifugal impact mills** and mixers are depicted in Centrifugal Mill and Mixer Literature—Entoleter, Division of Safety Industries, Inc.

Check 3740 opposite last page.

**Air separators**, which can increase 40- to 400-mesh output as much as 300%, are subject of Bul 087—Sturtevant Mill Company.

Check 3741 opposite last page.

**Vibrating screens** are detailed in Vibrating Screen Literature—Entoleter, Division of Safety Industries, Inc.

Check 3742 opposite last page.

**Crystal-drying centrifuge** has capacity of 20 to 24 tph of ammonium sulfate, 13 to 16 tph of caustic salt, and 1.0 to 2.5 tph of polypropylene. It is detailed in C-41 Super-D-Hydrator Bul—The Sharples Corporation.

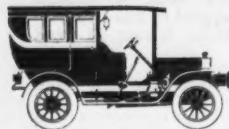
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For Maximum

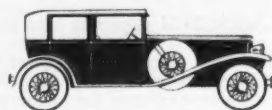
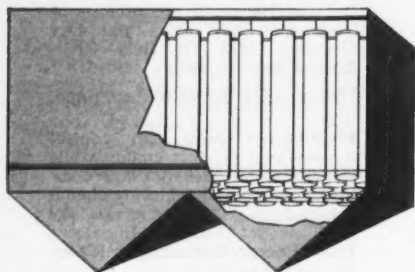
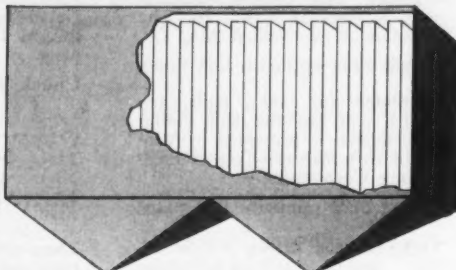
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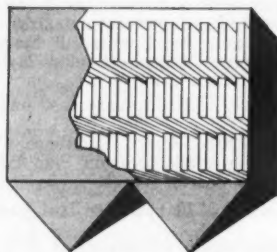
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Most filtering area per cubic foot of filter.



## SLY DUST FILTERS PROVIDE 20 TO 40% MORE CLOTH IN A GIVEN SPACE THAN ANY OTHER DUST FILTER.

*The new "Roll-Clean" Dynaclone gives:* Continuous cleaning, constant suction and complete accessibility in the least possible space.

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*Only the Dynaclone furnishes:* A single exhaust fan that does the entire job, providing both suction for dust collection and air for bag cleaning. No auxiliary blowers required.

*New "Resist-O-Wear" bags in the Dynaclone offer:* 200 to 300% more bag life, easier bag changing, simplicity of construction, and job-proved ruggedness.

More than 40,000 Sly Dust Filters in operation, including over 1,000 Sly Dynaclones, prove their advanced design. See for yourself . . .

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Check 3744 opposite last page.

## CURRENT LITERATURE

**Rubber-lined pebble mills**, available in size range of 40- to 13,000-lb capacities, are delineated in Cat 77—Abbé Engineering Co.

Check 3745 opposite last page.

**Centrifugals** are subject of Bul 2827—The Western States Machine Company.

Check 3746 opposite last page.

### Chemical Materials

**Chlorinating agents** are spotlighted in 24-page bulletin which summarizes key points on use of chlorine and derivatives to produce organic compounds. Typical reactions, with chlorine, hydrogen chloride, phosphorous chlorides, sulfur chlorides, thionyl and sulfur chlorides, and antimony chlorides are covered. Tech Bul 328-B—Hooker Chemical Corporation.

Check 3747 opposite last page.

**Surface active agents** are treated in 24-page Surface Active Agent Booklet—Onyx Oil and Chemical Company.

Check 3748 opposite last page.

**Boron-trifluoride** properties and typical uses are incorporated in Boron Trifluoride Tech Data—General Chemical Division, Allied Chemical Corporation.

Check 3749 opposite last page.

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**1,3-Butylene glycol** is stable four-carbon glycol. It is expanded upon in 1,3-Butylene Glycol Literature—Celanese Chemical Company, Division of Celanese Corporation of America.

Check 3750 opposite last page.

**Dicalite filter aids** are explained in Dicalite Filter Aids Literature—Dicalite Department, Great Lakes Carbon Corporation.

Check 3751 opposite last page.

**Catalyst** for use in polyester resins at intermediate and low temperatures is paste of benzoyl peroxide and tricresyl phosphate. It is covered in Data Sheet 7—Lucidol Division, Wallace & Tiernan Incorporated.

Check 3752 opposite last page.

**Phosphates**, for soaps, synthetic detergents, alkaline cleaners, used in oil-well drilling, textile processing, and as deflocculating and dispersing agents and water softeners, are subject of Phosphates Information—General Chemical Division, Allied Chemical Corporation.

Check 3753 opposite last page.

**Adipic acid** is reviewed in Adipic Acid Bul—National Aniline Division, Allied Chemical Corporation.

Check 3754 opposite last page.

### Material Handling and Packaging

**Belt (stream) weigher** of pneumatically operated type, for continuous weighing of dry materials at low to medium rates, is covered in Bul 36,20-1—Omega Machine Co., Division of B-I-F Industries, Inc.

Check 3755 opposite last page.

**Gas cylinders** are delineated in Gas Cylinder Bul—Harrisburg Steel Co., Division of Harsco Corporation.

Check 3756 opposite last page.

**Vibrating-conveyor** selection is aided by Lo-Veyor Selection Guide—Ajax Flexible Coupling Co. Inc.

Check 3757 opposite last page.

**Tractor-shovel** line is presented in H-25 Payloader Data—The Frank G. Hough Co., Subsidiary of International Harvester Company.

Check 3758 opposite last page.

**Vibrating conveyors** are treated in 16-page bulletin which is illustrated with a number of photographs. Bul 112 — Carrier Conveyor Corporation.

Check 3759 opposite last page.

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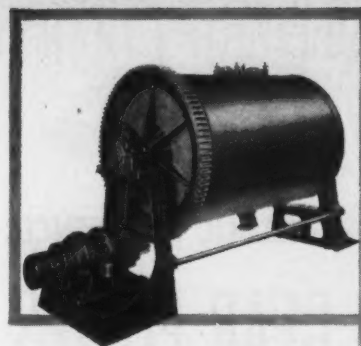
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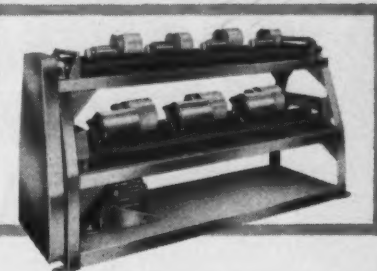
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Style P, Two-Tier Jar Rolling Machine for Multiple Batch Processing.

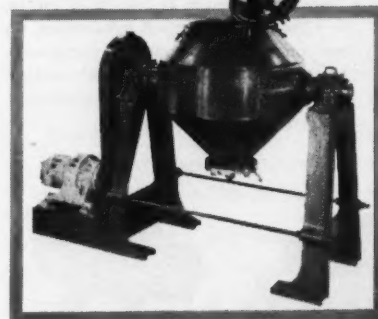


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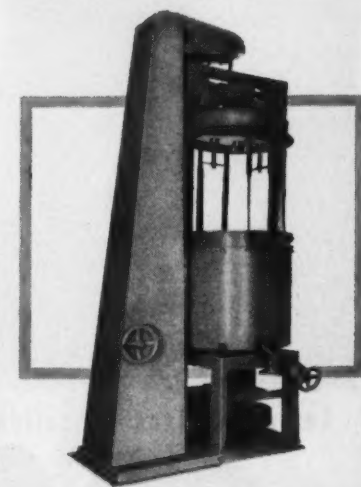
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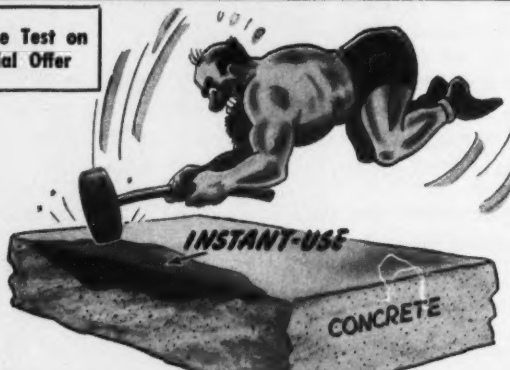
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## CURRENT LITERATURE

From page 158

**Pivot-balance leverage** system works in conjunction with straight electrical controls to control processing or materials handling by weight. Information on application of this system to filling, batching and checkweighing operations is contained in Flexure Plate Literature—Thayer Scale Corp.

Check 3765 opposite last page.

**Bin vibrators** which require no rectifiers are expanded upon in Vibratory Fact File—Eriez Mfg. Co.

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### Process Instrumentation

**Surface temperatures** of metallic or non-metallic materials, which are flat or curved, revolving or stationary, can be read in less than three seconds with portable Pyrocons. These units, which come in scale ranges to 2000°F with thermocouples for every application, are detailed in Bul 4257—Illinois Testing Laboratories, Inc.

Check 3767 opposite last page.

**Precision metering** of liquids is discussed in Metering Pump Information—Milton Roy Company.

Check 3768 opposite last page.

**Rotameter-transmitter** is specified in Design Specification Sheet DS-361—Brooks Rotameter Company.

Check 3769 opposite last page.

**Chemical feeders** are available in large or small capacities, with single or multifeeds for any type of drive. They are considered in Chemical Feeder Cat—Manzel, a Unit of Houdaille Industries, Inc.

Check 3770 opposite last page.

**Instrument line**, including full-size, miniature, electronic and pneumatic types, for measuring, recording, automatic control and telemetering is covered in Instrument Information—The Bristol Company.

Check 3771 opposite last page.

**Dial indicator** has color-coded target-type pointers against 10" scale. It is delineated in Cat 98347—Taylor Instrument Company.

Check 3772 opposite last page.

**Metering products** are subject of 2700 Flowmeter Booklet, Variable Head Meter Booklet, Turbine Meter Booklet, Magnetic Flowmeter Booklet, "How to Select Flowmeters" and "Instruments Available from Stock"—Fischer & Porter Co.

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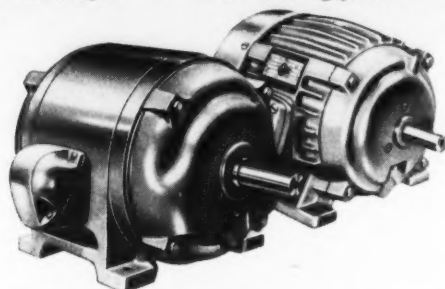
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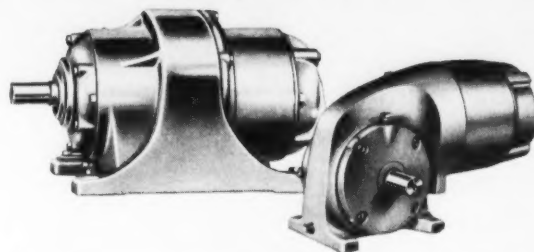
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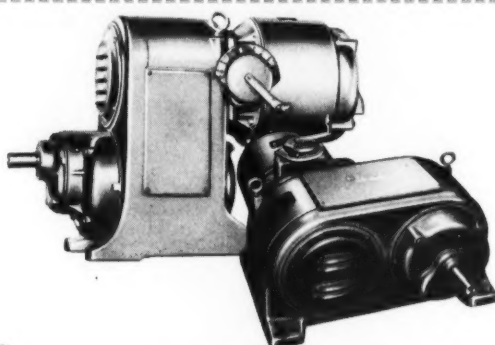
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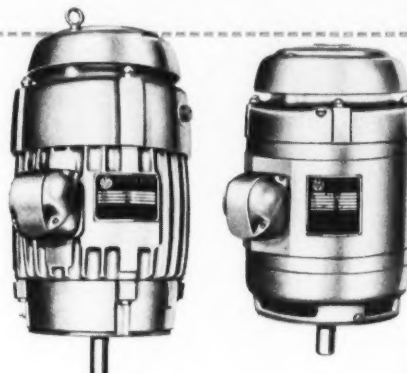
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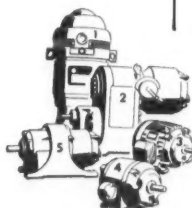
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